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The Argentine Loan

On Monday, January 4, a syndicate of American bankers offered to the American public $15,000,000 6 per cent notes of the Argentine government and the entire offering was sold within a few hours. The amount is, of course, almost insignificantly small when compared with the scale on which London bankers finance foreign needs; but as an indication of the actual steps which are being taken toward extending trade possibilities to South America, this piece of financing by American bankers for the Argentine government is a most propitious opening for 1915. The prejudices and practical difficulties in the way of selling American supplies, including, of course, railway supplies, to South American countries are as nothing compared to the fundamental difficulty which has heretofore existed, in that South American countries buy from the nation which finances their needs, and heretofore the United States has not been the banker for any foreign country of importance. As the New York Sun points out, this Argentine loan is the latest of a series which, within the last few weeks, has totaled $72,590,000 of foreign government loans offered publicly in the United States. Encouraging as this is from the manufacturers' and railway supply concerns' point of view, it emphasizes the point made by the railroads in their case before the Interstate Commerce Commission that the railroads are faced with an unprecedented competition in their bid for capital to be subscribed by the American investor. The Argentine loan was offered to yield 6 per cent on the one-year notes and 6¼ per cent on the two and three-year notes, the offering being divided into three series.

Broad Interpretation of Demurrage Rules

The Supreme Court of the United States recently rendered a decision by Chief Justice White, in a demurrage case, which is likely to have considerable importance in its effect on the interpretation of demurrage rules. The case was that of the Berwind-White Coal Mining Company against the Erie, and involved the question whether demurrage charges should be paid on carloads of coal shipped by the plaintiff coal company from West Virginia to Chicago, there to be reconsigned. It was insisted on behalf of the plaintiff that the tariff only authorized demurrage at destination and that the cars never reached their destination. They were held at Hammond, Ind., where are located the storage tracks of the railroad for cars billed to Chicago for reconsignment. This is a considerable distance from the terminals of the road nearer the center of the city, but is convenient to belt lines by which cars can be transferred to any desired new destination, and, as the court observes, the holding on such tracks of cars consigned as were those in question, was in accordance with a practice which has existed for more than 20 years. "Under these circumstances," the chief justice concludes, "the contention of the coal company is so wholly wanting in foundation as in fact to be frivolous." The decision is important not only in making it clear that the payment of demurrage charges may not be avoided on a technical claim that delivery was not actually effected at the destination named, but especially because it shows that the Supreme Court believes that the demurrage rules should be interpreted broadly and that their purpose should not be nullified by frivolous technicalities.

Train Crews and Safety

The Public Utilities Commission of Connecticut, after a thorough investigation of the operation of both freight and passenger trains in the state, with reference to the number of brakemen required, has recently issued a report finding that in general the trains "are now sufficiently manned, and operated with a degree of safety which no order for a general increase of trainmen would augment." One of the principal arguments advanced by railroad officers against the "full crew" bills has been that there is no necessity for legislatures to regulate the number of brakemen when the state railroad commissions have ample authority to do this if the safety of the public or of the employees requires action. This argument prevailed with the legislature of Connecticut at the 1913 session, when, for a bill requiring the employment of additional brakemen, there was substituted one directing the state commission to investigate the requirements and conditions of the service and make whatever orders might be deemed necessary. The report of the commission was published in part in the *Railway Age Gazette* of December 18, and some of its findings make instructive reading. "We feel," said the commission, "that to increase the prescribed minimum gen-

erally, or to increase the train crews beyond a reasonably safe requirement, would tend rather to lessen efficiency, and to decrease safety in operation because of a greater division of responsibility and the lessened individual alertness which would follow. The facts brought out in the present investigation disclosed no instances of the jeopardizing of the safety of either the public or employees which increased train crews would prevent. It is the belief of this commission that, of all the railroad accidents attended by fatalities which have been reported to and investigated by it, not one has been attributable to an insufficiency in number of the train crew involved." It is hardly to be expected that such conclusions will have weight with the class of politicians who are always eager to vote for anything a labor union asks, but they should influence legislators who have been deceived into thinking the train crew bills were safety measures.

DISCREDITABLE ACTION REGARDING RAILWAY MAIL PAY

BY passing the railway mail pay rider to the postoffice appropriation bill introduced by Chairman Moon, of the House Committee on Postoffice and Post Roads, the House of Representatives has added another very discreditable chapter to the very discreditable record which Congress and the postoffice department have been making for years in dealing with the question of compensating the railways for carrying the mails.

The question of the reasonableness of railway mail pay had been vigorously raised by the carriers before the parcel post law was pasesd, and they had presented to the department, to Congress and to the public convincing evidence that the government was not adequately remunerating them. Despite this, Congress enacted the parcel post law, thus adding largely to the mail service which the railways had to render without providing for any additional compensation for the service. After the roads had been carrying the parcel post matter some time for nothing, Congress provided for an increase in mail pay not exceeding 5 per cent. This was wholly insufficient to cover the increased expense forced on the carriers by the parcel post.

Meantime, a joint committee, created by Congress for this express purpose, was engaged in investigating the whole subject of railway mail pay. This committee prepared a report severely criticising the attitude which the postoffice department had assumed, and recommending a further increase in mail compensation of at least $3,000,000 a year, together with action to relieve the railways from the rendering of certain incidental services which are now rendered without payment and which represent an expense to them of several million dollars annually. Thus, the claim of the railways that they were being unjustly dealt with received the sanction of a body created by Congress itself to determine the facts and the equities involved.

Mr. Moon and his committee ignored the report of the Joint Congressional Committee, of which former Senator Bourne, of Oregon, the author of the parcel post law, was the chairman. They reported a rider to the postoffice appropriation bill which would increase the pay of the railways by $2,000,000 during the next year, but the later effect of which would be, according to a statement made by Mr. Moon on the floor of the House, to reduce their compensation by $8,000,000 annually. One does not have to be apt at figures to see that between the recommendation of the Bourne committee and Mr. Moon's estimate of what the enactment of his measure would save to the government, there is a difference of at least $11,000,000.

On what grounds did Mr. Moon demand the passage of his bill? Chiefly on grounds political. With engaging frankness he said, "the Democratic committee on postoffices and post roads asks for a rule to consider legislation that would save to this country millions of dollars; and *the Democrat who turns his back on that demand violates the best interests of the Democratic party.*" In other words, this bill ought to be passed, not because it was based on investigation, not because it was honest, not because it was fair or in the public interest, but because it was conceived that it would promote "the best interests of the Democratic party." And now, convinced by Mr. Moon's extraordinary argument, the House has passed his bill.

It is impossible to characterize the course of Mr. Moon, of his committee and of the House of Representatives in parliamentary language. Impervious to every argument based on considerations of fairness and honor, they have attempted to commit the government of the United States to a policy of robbery of the railways in order that for political reasons it may show a profit in the operations of the postoffice department. Such action either will or will not deprive the railways of a fair profit from the handling of all their business. If it does deprive them of a fair profit from all their business its tendency must be to starve the roads, and thereby disable them from rendering satisfactory service in the transportation of freight and passengers as well as mail. If it does not deprive the railways of a fair profit this will be due to the fact that they will be allowed to charge travelers and shippers high enough rates to reimburse them for the loss which they will suffer from their mail business. In that event, shippers and travelers will be required to pay higher rates than they otherwise would be in order that the postoffice department may show economies in operation and profits which in reality do not exist.

Is this a suitable way for the government of the United States to transact its business at a time when it is engaged in thundering and legislating against inefficiency and crookedness in other lines of business? Ought it not to teach business concerns generally how to be fair and honest and decent by example as well as by regulation? The crookedest bunch of pirates that ever gutted a corporation in Wall Street were as good citizens as members of Congress who will commit the government to a policy of robbing corporations for political purposes.

The obviously fair and square thing for Congress to do would be to delegate to the Interstate Commerce Commission the authority to fix reasonable rates for carrying the mails. Why should passenger rates, express rates and freight rates be made subject to the commission's jurisdiction while the rates for carrying the mails are subject to the arbitrary fiat of the politicians in Congress and the politicians in the postoffice department?

"POISONING THE WELLS"

THE hardest task ever undertaken in the history of mankind is for public utility corporations to please their professional critics. The managers of steam railways, electric railways, light and power companies and similar concerns receive innumerable requests from the universities for co-operation in carrying on their business courses. In many instances these requests are specifically for practical lectures on practical subjects by men who are practical because they are now engaged in the kinds of work which the students are trying to fit themselves to do. Recently, the American Electric Railway Association adopted a "code of principles," one of the proposals of which was that men of prominence in the electric railway field should avail themselves of the opportunities presented to make addresses before student bodies in order that a more thorough and better understanding between the railways and the public might be brought about.

This called forth the following comment from the New Republic, a new weekly magazine: "We are much in need of a far more thorough exposition of the practices and purposes of the public service companies—an honest partisan exposition of their side, with no pretense to a monopoly of 'correct principles.' But a deliberate policy of 'influencing public

opinion at its source' is sure to be worse than futile." Then followed the familiar "well-poisoning" figure.

The implication regarding the purposes and motives of the Electric Railway Association is plain. But who, pray, is to determine whether an exposition of the practices and purposes of the public service companies is honest or is intended to "poison the wells"? The man who makes the exposition is quite as likely as anybody else to know the honesty of his own motives; and if he happens to be a practical expert on his subject he is quite as likely to know whether his statements are correct or not as is anybody else—as is, for example, some writer who adopts the pose of omniscience, and then devotes his life to carping, superficial, negative criticism of those who are engaged in constructive work.

It is to be hoped that the doors of the lecture rooms of our universities will be opened wider and wider to those who really know, because they have learned in the hard school of experience, and that those who really know will more and more frequently enter. Lectures by such men will help to purify some wells which have already been poisoned by numerous writers and teachers who really know nothing about commerce or industry, and who have become neo-socialists and are making their students neo-socialists because they have immured themselves in their libraries and buried their noses in books, instead of getting out into the great world of human activity and learning what is really going on there.

THE SECURITY OF EQUIPMENT TRUST CERTIFICATES

THE Investment Bankers' Association committee on equipment trust certificates urges members of the association to insist, as a condition of purchase of equipment trust certificates, that certain rigid requirements be complied with by the railroad company. The report of the committee is published elsewhere in this issue. In the opinion of the committee 20 per cent of the cost of the equipment should be paid for in cash by the railroad company; the certificates should mature semi-annually or annually within a period of ten years or less; bankers buying issues of equipment trust certificates should require periodical reports from the railroad company as to the condition of the equipment securing the certificates, and great care should be taken that the title to the equipment does not pass through the railroad company's possession so that there may be no possibilities of legal difficulties because of provisions of other mortgages of the railroad in case of the necessity for foreclosure of the equipment trust certificates.

Railroad men, who are even more concerned with the maintenance of railroad credit than are the bankers, will be thoroughly in accord with the last of these suggestions. Equipment trust certificates have generally been considered particularly good investments because of the tangibility of the assets securing them and the directness of the lien on the assets created by the indenture. The value of equipment trust certificates as investments is enhanced by the fact that in case of a receivership the trustee of equipment certificates is in a strategic position in a great many cases as compared with the trustees of other mortgages because of the simplicity of enforcing his demands, whereas the trustee of a general mortgage may find it necessary to bargain and finally accept a compromise in any plan for reorganization, since the assets securing the general mortgage bonds are inseparable from assets and equities of other security holders.

The other two suggestions, however, are open to argument. It is a practical and physical impossibility for a railroad management to know at any given date just what is the condition of its freight cars. Some of these are scattered all over the country. Repairs are being made by other lines for which the railroad company responsible for the equipment may not receive bills for a considerable period. There is furthermore a question as to the advisability of bankers attempting to directly supervise details of railroad operation such as the repairs of equipment. When and how repairs should be made is an operating question controlled, of course, like many other operating questions, by the ever present financial question as to the company's immediate resources and income. As such it would be likely to suffer rather than be benefited through interference in the consideration of it by bankers. The general credit of a railroad company issuing equipment trust certificates should, and does among discriminating investors, affect the price at which equipment trust certificates of that company can be sold. One of the factors in the general credit of a company is the adequacy of maintenance.

The facts that underlie this particular recommendation of the committee have to do with the relations of the investment banker and his customer. The investment banker knows that in the great majority of cases the individual customer relies on the reputation of the banker offering him an investment fully as much as he does on his own knowledge of the security behind the investment or the credit of the company issuing the securities. While this is admittedly true, it does not and ought not to clothe the investment banker with the responsibility of detailed supervision of keeping intact the security back of bonds or equipment trust certificates. The banker's responsibility should be that of making a very thorough investigation of the credit, maintenance policy, etc., of the railroad company before recommending to his customer equipment trust certificates or any other securities of the company. This, however, is about as far as the banker's responsibility can extend.

The other suggestion that 20 per cent of the cost of equipment be paid in cash by the railroad company and that the certificates be paid off in instalments within a period of ten years, suggests some considerations as to the advantages or disadvantages to a railroad company of financing through the sale of equipment trust certificates. As a matter of fact, it is more often the roads whose mortgages are such as to make it difficult for them to pay for equipment out of the proceeds of general mortgage bond sales, or whose current funds are not sufficient to permit of the purchase of equipment outright from current funds, that resort to the issue of equipment trust certificates. But if equipment trust certificates are resorted to, a railroad company has to face a semi-annual drain on its current funds which may come at a time that is quite inconvenient, and it has eventually to pay for the equipment entirely out of surplus earnings, assuming, of course, that the company remains solvent. For instance, a road buys 110 locomotives costing $2,200,000 cash. It has to draw on its current funds for $200,000, for which in some cases it is possible to use the proceeds of general mortgage bond sales, but in others not possible, depending, of course, on the provisions of the general mortgage. It issues $2,000,000 equipment trust certificates maturing in ten annual instalments.

Assuming that the company is liberal in its expenditures for maintenance and its charges for depreciation, in the neighborhood of $330,000 will be spent in repairs each year, $66,000 will be charged each year for depreciation, and $200,000 will be paid out of current funds each year and charged to additions to property, through income and surplus, for maturing instalments of the equipment trust certificates. At the end of five years there will be but $1,000,000 of securities outstanding against equipment intrinsically worth at least $1,700,000, with a further charge to expenses of $330,000 for depreciation. If the road has shown a surplus or at least not shown a deficit for the five-year period, the $330,000 charged for depreciation is an addition to its assets through income, although, of course, it is not a specific fund or asset set aside. At the end of ten years the company will have paid for the equipment entirely out of earnings and further charged expenses with $660,000 for depreciation. All this amounts to a quite rapid addition to property investment without any addition—after the transaction has been completed—to capital securities and is all very conservative and possible for a strong road; but it is the weak roads which have in the past found their way out of difficulty in certain cases through the issue of equipment trust certificates. Viewed from this angle 20 per cent paid from current funds and a limitation to 10 years seems rather more than ample protection to safeguard equip-

ment trust certificates. The investment banker's suggestion is analogous to the Interstate Commerce Commission's requirements in regard to depreciation in that it accentuates the weakness of weak roads and the strength of strong roads.

THE PRACTICAL LIMIT OF DETAIL IN THE FEDERAL VALUATION

THE abstract of the instructions to the federal valuation parties published on another page will be of special interest to engineers, outlining as it does not only the methods for the conduct of this work, but the nature and extent of the information which the government forces are to secure.

The roadbed is to be cross sectioned with almost the same detail that it would be measured up for a contractor's estimate, and all material is to be classified. The ties and track fastenings are to be estimated from a count of the actual number in two 600-ft. sections per mile. The weight of the rail in all main and side tracks, together with the year in which they were laid, are to be ascertained, while the depth of the ballast is to be determined by digging into it at intervals not greater than 1,000 ft.

The prosecution of this work in such detail will impress many railway engineers as unnecessary. There is no question but that the valuation is being made in much greater detail than a possible purchaser of the roads would require. It would seem that the amount of earthwork, especially on lines completed within the past few years, could be determined with sufficient accuracy for all practical purposes from the records of the company, checked by accurate measurements of limited stretches at various intervals. Likewise, the records of rail in main tracks, which most roads keep for their own purposes, should, if verified by a reasonable amount of checking, be accepted as affording complete and accurate information.

In the determination of hidden quantities and unit costs for earthwork and other materials it will be necessary for the government to consult the records of the roads, and such records will undoubtedly have considerable influence in the final determination of the prices used. If reliance is placed on the records of the roads for such data it would not seem inconsistent to accept information as to other quantities which investigation shows are reasonably accurate.

The federal act providing for the valuation does not state the purpose for which it shall be made, whether for rate-making, the regulation of securities or ultimate government ownership. Therefore, it is necessary for the government forces to secure data in sufficient detail to provide the necessary information for any or all of these purposes. As in the case of any project of great magnitude and without precedent, it will be recognized as advisable for the government to collect too much rather than not enough data. Valuations made by some of the states and by the railways themselves have not withstood the test of the courts because of the inadequate data on which they have been based. Now that the government is definitely committed to this project it is highly expedient that it be carried through with the proper degree of thoroughness to withstand any attacks of this character. Also, in order satisfactorily to execute this project it is necessary to establish a spirit of mutual confidence, and of co-operation, between the forces of the carriers and those of the government. But if this spirit is established it will undoubtedly be possible to accept considerable data from the carriers which the government forces are now collecting independently in the field.

It is equally to the interest of the carriers and the government to eliminate all unnecessary duplication of work in order to reduce the expense to the practical minimum, as well as to hasten the completion of the entire valuation. The instructions under review may, therefore, be assumed to show the maximum amount of data which the government forces are to be called upon to collect, and it may reasonably be expected that as the forces, both of the government and of the railways, become better organized and more familiar with their duties, material modifications in the instructions will be made.

Letters to the Editor

ERRORS IN LOCATION AND CONSTRUCTION

St. Louis, Mo.

To the Editor of the Railway Age Gazette:

On reading your editorial on the subject of valuation in the issue of December 18, the thought occurred to me that the so-called valuation is an inventory of what exists on the road at the time it is taken, to which current prices are supposed to be applied to obtain the "value" of the property. But does this ascertain the value? Where a road has been built two or three years the "cost" (which is but the "value") might be ascertained, if it were not already known from the auditor's books. But when a road has been built 25 or more years the question of experience comes in, aside from any "adaptation or solidification of roadbed."

At the time the railroad was built errors of judgment were certainly made in the haste of location and construction, and all the years since have shown these, and they have been corrected. Grades were too low in places, bridges were too small or wrongly placed, damages had to be paid (often extending over many years) for defective drainage, personal and other injuries took place, etc. No engineer is infallible, and if the road were to be "reproduced at present prices" none of these errors would be taken into account, although they undoubtedly would occur. The percentage for contingencies would be very large, in many cases from 50 to 100 per cent.

C. D. Purdon,
Chief Engineer, St. Louis Southwestern.

THE BROOKLYN SIGNALING CONTRACT

New York City.

To the Editor of the Railway Age Gazette:

In the article in your issue of December 25, "Signals for New Brooklyn Subways," there is an error in the paragraph reading: "When the new bids were opened the Federal Company, whose bid was higher than that of the General, protested that the action of the company and of the Public Service Commission was irregular and unwarranted."

This company was never asked to submit but one bid, upon one set of specifications. Upon these specifications the Federal Signal Company was the low bidder. The Federal company was subsequently requested to meet the price which had been offered by the General company after the bids were opened, with the privilege to the New York Municipal Railway Company to substitute a speed control and cab system, provided a satisfactory scheme could be developed.

The Federal company offered to grant the privilege of this substitution, but refused to lower the price $100,000 to meet the revised bid of the General company, which had reduced its original price $515,000; this for the original specifications with the additional option to substitute a speed control system.

The only communication received by the Federal company from the New York Municipal Railway Corporation, after the bids were opened, was the following from the president of the latter corporation, as follows:

> I have yours of even date. I assume that your company would be able to develop a system which might be as efficient as that proposed by the General Railway Signal Company, but even upon this assumption we save something over $100,000 by adopting their proposal as against yours.

In view of the above it is evident that there were only one set of specifications offered for bidding, and the chief engineer admitted at a hearing which was held before the Public Service Commission that he would not know how to draw up specifications for a speed control system.

Federal Signal Company.

Organizing the Supply Department on the Seaboard Air Line

Sufficient Facilities and No Division of Authority Proved to Be the Essentials of Success of This Organization

By H. C. Pearce
General Purchasing Agent, Seaboard Air Line

The purpose of the organization of the supply department of the Seaboard Air Line is best expressed in President Harahan's circular of July 19, 1913, which reads:

The General Purchasing Agent will have charge of the purchase of all materials and supplies. He will have charge of the Stores Department, which department will have jurisdiction over all materials and supplies on the railroad not actually in the hands of the various officers for application to specific work. The Purchasing Agent and General Storekeeper will report to the General Purchasing Agent.

The problem was how to place the resources immediately under control and at the same time carry on the considerable work that was under way without delay or incurring any unusual expense. It was necessary to act quickly in order to meet the unfavorable business conditions that had already set in.

The Seaboard Air Line operates 3,100 miles in the states of Virginia, North Carolina, South Carolina, Georgia, Alabama and Florida. It has extensive terminals at Portsmouth, Va.; Hamlet, N. C.; Atlanta and Savannah, Ga.; Jacksonville and Tampa, Fla. The territory it serves and the class of traffic that it handles makes it subject to very close supervision and closer operation.

The stock on hand, as represented by the balance sheet, was small considering the mileage, being only $1,896,755, June 30, 1913, including rail, fuel, cross ties and dining car supplies. Mr. Harahan was too close an observer to be misled by the figures shown by the balance sheet. He knew that there was a large amount of material on hand that was not reflected by these figures, and that the purchases were entirely out of line. He had a thorough investigation made by an expert which proved that his conclusions were correct.

It was the same old story. In order to forestall criticism and investigation, which is always aimed at the stock as reflected by the balance sheet, and the payroll, it was necessary to resort to the common practice of charging out the material when it was received and letting the users handle it, or, in other words, handle the bills instead of the material. Naturally the material was scattered over the entire system, each individual looking out for himself as best he could. There were storekeepers at some of the more important points, but they merely looked after the delivery of the material as best they could. No attempt was made to handle other than supplies used by the mechanical department.

After making a careful inspection of the property, I was satisfied that while the usual thing to do would be to call for sufficient facilities and organization to inventory, bring in and arrange the material at central points for issue at once, such a plan would involve an investment and operating expense that would not be considered, and besides, I was not fully convinced that this expense was warranted, or that reasonably good results could not be obtained in a different way and without in any way diverting from the purpose desired.

The plan decided upon was to organize the purchasing, storing and distributing first, and follow up later with the organization of the division stores and outside depots. A review of this work may be of interest to those who have similar problems to meet:

PURCHASING

Consolidation of Purchases.—Arrangements were immediately made to have the purchasing agent buy everything except commissary supplies. This included locomotive fuel, cross ties, lumber and stationery, as well as a large quantity of materials and supplies which were formerly purchased by division officers, such as superintendents, division engineers, roadmasters, etc., under the guise of emergencies. It is absolutely necessary to consolidate the purchase of all material in one office in order to exercise the necessary control.

Consolidation of Requisitions.—Arrangements were promptly made to have all requisitions pass through one channel where they could be recorded, checked, consolidated and filled from available material, or arrangements made for purchase under proper specifications. Requisitions are given a number when received by the general storekeeper and this number serves as a requisition, inquiry, proposal, order and correspondence file number; thus making one number the means of identification for all interested parties. This, it will be appreciated, is of great importance in systematizing the ordering, tracing, inspection and accounting.

Inquiries or Bids.—Arrangements were made to send out inquiries, or what are commonly known as bids, for all materials or supplies not covered by contracts or agreements. It was arranged to first establish an inquiry list of commodities arranged alphabetically. This list is added to or deducted from as occasion demands. Inquiries are sent out to all firms on this list. The proposals received are tabulated on quotation sheets and the business awarded, everything being equal, to the lowest bidder. This sheet, including the inquiry and proposal, together with copy of the order, is attached to the requisition, to which is added any subsequent correspondence.

Price Records.—Price cards and loose leaf price books were established, thus giving a perfect description of commodities arranged in alphabetical order, showing the quantity, order number, date of order and name of seller, together with prices and delivery point. Quotations are entered on the same card, except that they are entered in red. These cards also answer the purpose of a correspondence index file.

The price cards present a picture of each transaction. They serve the further purpose of a correspondence file and a still further purpose of a record of quantities for comparative purposes.

Checking of Invoices.—A copy of the order is placed on the order file, in addition to the copy which is filed with the requisition, arranged numerically. This gives the name and address of the seller, description of material, prices, quantity, agreed delivery, quotation number, routing and destination. The invoices are checked against this record before they are sent to the general storekeeper's office, and date of shipment as shown on invoice and bill-of-lading entered thereon.

It is the duty of the purchasing agent to see that all invoices are accurately checked as regards quantity, prices, date of shipment, delivery and delivery point before the invoices leave his office.

Tracing.—A systematic system of tracing was installed. This is done from the order file referred to above. It is the duty of the clerk having charge of this work to see that deliveries are made in accordance with the deliveries specified on the face of the orders, and to guard against overshipments. Orders should show the deliveries, and material should be traced before being asked for. The delivery should be as much a part of the agreement as the price. It is the duty of the purchasing agent to see that deliveries are made in accordance with terms of purchase. He should not wait until he is asked to trace for material.

STORING

Organization of Stores.—It was decided to organize two general supply depots to care for the system at the two principal shops. Sufficient platforms, racks and bins had to be provided

to properly segregate not only the material on hand, but the material that was not needed, which we intended to bring in from off the line, and take back from the shops where it had been drawn and not used.

We decided that in order to save time and expense, we had better go ahead and do this work with store labor under our own supervision.

The stock was arranged in section order, which consists in a section being assigned to the same general class of material, which is based on combining such classes of material as would naturally be handled to the best advantage by a single man. For example, all of the air brake material, lubricators, injectors, sanders, etc., were segregated in one section, the idea being that the man who has charge of this section of material must have knowledge of this class of equipment. Another section contains bolts, nuts, lag screws, etc., which can be placed in the hands of a laborer without technical knowledge. Bar iron, flues, firebox steel, tank steel, arch brick, etc., were segregated in one section for the reason that this class of material is usually maintained adjacent to the boiler and smith shop.

The plan has as its basis the purpose of having one man who has actual knowledge of and who is responsible for the ordering, receiving and delivery of every item in his charge, actually handle it with his own hands, as well as keep his stock records. The plan is broad and flexible enough to meet any conditions.

Preparation of Stock Books and Standard Lists.—Due to the fact that the practice had been to send a large portion of the requisitions directly to the purchasing agent, it was very difficult to secure proper description of material. It was necessary that stock books be prepared immediately, giving this information, so that we could use these books as a guide in checking requisitions, both as regards quantities and description.

The stock books are fundamental, and must be so prepared and maintained as to show what is actually on hand at each point every thirty days, what is due on unfilled obligations and the average monthly consumption over a period. Each item must be fully and completely specified, and still further, identified by a number. This record is the basis of calculations in placing requisitions for future requirements, plus such additional information as may be known to the storekeeper at the time.

Inspection of Material.—Arrangements were made to have all material as far as possible pass through the general stores for the purpose of proper inspection and control. Probably nothing has been so sadly neglected as the inspection and checking of material. This is due to the mistaken idea of the economy of direct shipments to save handling.

There is only one way to have material properly inspected, compared and checked, and that is to have it pass through the general stores where we have sufficient trained men to properly do the work. Material which requires chemical analysis or technical inspection is covered by an inspection certificate which is attached to the purchase bill.

The best inspection of all is that of the section storekeeper who receives and handles the material in conjunction with the user. These men are in position to know what is best suited for the work, and it is wonderful what can be accomplished by applying this method of inspection to most materials and supplies.

DISTRIBUTION

Store Delivery.—Realizing the importance of having the material delivered directly to the users instead of over counters, as is the usual practice, a store delivery system was installed at once, which consists of an organized force sufficient to deliver the material directly to the users instead of having mechanics come to the storehouse and be waited on by attendants.

In addition to the expense and delays of having mechanics and helpers leave their machines to go to the storehouse to obtain material instead of having the material delivered directly to them, as it should be, another fundamental fact must be apparent—that in this way the section storekeeper is in position to actually know that the material is needed and that it is suitable for the work required. This enables him to utilize a great deal of material which otherwise would become obsolete. It also enables him to keep up his stock and prevent the accumulation of a surplus, either in the stores or in the shops.

During July, there were 5,575 individual deliveries made to the shops at Portsmouth, or an average of 214 for each working day. The force consists of a foreman, one man and four boys. Boxes are placed at 25 points throughout the shops and regular trips are made every 30 minutes, and as many additional trips as may be necessary—the boys picking up and bringing in the tickets on their rounds. This crew also brings back to the stores the shop-made material and repair work.

Supply Train.—Supply cars consisting of one car for miscellaneous material and track tools, and a car for oil, had been in operation on local trains, but they were not a success. The supply train was established in November, 1913. This train delivers all material used for ordinary maintenance and operation except rail, ties and lumber, and it picks up all serviceable tools and salvage that for any reason is not needed. An inspection of all supplies and tools at each tool house and supply depot on the system is made every 60 days, and only what is actually needed, after a personal inspection on the ground, is delivered.

The supply train is to the system what the store delivery is to the shops. This train should be accompanied by the roadmaster, division engineer, general storekeeper or inspector of stores. It offers the only thorough and practical method of distribution and control of materials and supplies for maintenance and operation, and is the only medium by which accurate information can be obtained as to what is needed before it is delivered, the service materials and tools are giving, and other information which a supply officer must have first-handed in order to intelligently provide and control issues.

Reclamation of Material and Sorting of Scrap.—Practically no attention had been given to the reclamation of material and the sorting of scrap. The practice had been to sell a great deal as miscellaneous scrap. This for the purpose of saving the cost of handling.

This work was taken over September 1, 1913. From that date all scrap received was carefully sorted into classes, in addition to the enormous quantity which was already stored in the yard. Facilities are being gradually installed and the work of reclamation is being gradually increased. In the meantime, everything which we believe can be reclaimed is being segregated and laid aside until we have the facilities to do the work properly.

There is an unlimited field for saving in the handling of salvage on a railroad. Nothing should ever be scrapped that can be made available for use at less than the purchase price.

Stationery Store.—The purchase of stationery was formerly done by the stationery storekeeper. The turning of this work over to the purchasing agent greatly reduced the prices of all forms. We recently installed a printing press which further reduced the cost of forms.

The cost of stationery does not reflect what was done for the reason that during the past year we purchased a great many mechanical appliances, such as billing machines, adding machines, comptometers, etc. The saving effected in printed forms was more than consumed by the cost of these mechanical appliances, the cost of which was charged to the same account.

Division Stores.—As soon as the two general supply depots were properly organized, we took up the work of organizing the division stores along the same general lines. This work has progressed slowly, and it will take considerable time to go over and arrange all of the material at outside points, ship in what is not needed and arrange the remainder in sectional order. Uniform stock books will be established at all division points this year.

With two general stores properly organized and the supply train system thoroughly installed, we are in position to reduce the stocks at outside points to a thirty days' basis, and maintain them with the minimum of expense. The purpose is to re-

duce the stocks of material at outside points until we will deliver each month only sufficient to take care of the requirements for the succeeding month, picking up and bringing back to the general supply depots what remains for any reason. Division engineers' and roadmasters' stores are being dismantled and the material brought into the general supply depots.

The following, so far as such things do, will reflect the work accomplished:

Unapplied material recovered and returned to the Stores	$121,507.00
Usable material recovered from scrap and returned to the Stores	6,482.00
Usable material reclaimed from scrap, issued and charged direct to the Maintenance of Equipment	24,544.00
Scrap reclaimed and credited to Maintenance of Equipment	208,428.00
Scrap reclaimed and credited to Maintenance of Way	58,117.00
Inventory overage charged direct to Store Stock and credited to Operating Expenses	55,818.00
Material investment reduced	227,983.00
Purchases reduced	178,606.00

The real work, however, consists in the organization and system which has been installed, the merit of which will be reflected in decreased purchases the ensuing year.

It will be recalled that the reorganization was not effected until July 19, 1913, and we really did not get started until September, so that these figures only cover a period of ten months.

The merit of the supply department consists in providing better service with less expense and *less net cost for materials.* Work of this kind can really only be reflected in the final operations of the property.

Attention is called to the fact that we made no expenditures for improvements and facilities other than such as we have done ourselves. We were simply obliged to do the best we could with what we had.

My experience has fully convinced me that no supply department can be effective, no matter what the experience or ability of its officers, that has not a well defined purpose and a thoroughly practical plan, fully understood and supported by the chief executive.

Our railroads must realize before the question of supply can be properly controlled, that the great need is to discourage the accumulation of large quantities of material in advance of requirements, and that the presence of material unused, is a much greater sin than its absence.

I am firmly of the opinion that a plan can be devised and carried out whereby work will not suffer for lack of material when once it is thoroughly understood in the operating departments that it is as wasteful to have material unapplied as it is to have labor unemployed.

There are certain fundamental principles involved in carrying out any plan, which must be understood and adhered to.

First.—Sufficient facilities and organization to properly purchase, care for and distribute what is actually needed, and some method of determining that material is actually required and will be used promptly. The time to reduce purchases is before they are made. No real economy can be obtained when everyone has all they need at all times. Material for specific work should not be bought until it has been decided beyond reasonable doubt that it is going to be used and within a specified time, and the purchase arranged accordingly. A large percentage of the material on our railroads is material which was ordered for some particular work and the work either curtailed or abandoned.

Maintenance officers should be held rigidly accountable for material on hand unused. Broadly speaking, there should be no stock outside of the storehouses. Altogether too much attention has been paid to complaints that work was delayed or the cost increased for want of material. Few of these complaints are justified, and are merely a fence. Very little work is ever delayed on a railroad for want of material. There is always enough to do on a railroad so that there should be no delay to work as a whole. Fear of criticism and desire for commendation has made many of our supply officers and storekeepers impotent. These officers must be supported and strengthened in their efforts to control the purchases and stocks and prevent unnecessary accumulation.

Second.—There must be no division of responsibility from the time the purchase is authorized until the material is actually delivered to the work and the salvage disposed of.

With these principles clearly defined and understood, the work is then a matter of system and applied common sense.

PROSPECTS OF STATE OWNERSHIP IN ENGLAND*

BY W. M. ACWORTH

When I was invited last spring to address you this autumn on the subject of Railway Nationalization, none of us expected that we should be confronted with a *fait accompli.* Today the railways of this country, with unimportant exceptions—Ireland has got home rule in this matter—are nationalized. And it has been done so quietly that the man in the street doesn't know that it has been done, and that the porter in Queen street is at this moment a government official. But so it is, and it shows how easily the thing can be done. It may be undone—I don't think it will be—if two of the most influential men in the cabinet get their way, and induce their colleagues to see what a good opportunity the conclusion of the war would be for bringing forward a great scheme of social policy which cuts across normal political divisions.

But in any case, what has been done once can be done again. And it may be done again in the same way—taking over the whole thing as it stands by an interim arrangement and dealing gradually with knotty problems, such as the rights of the different classes of shareholders, the reorganization of the tariffs of the unified system, the right of state servants to strike, and so on—I only mention a few.

That nationalization of our English railways is bound to come, I have long believed. That it will come pretty soon, I fully expect. Judging by the evidence before the Royal Commission now sitting, the great majority of the great manufacturers and traders of the country are opposed to it, the Leeds Chamber of Commerce among the number. But the captains of industry have few votes; the railway servants alone can vote them down; the Trade Union vote would simply swallow them. And I have no doubt which way the working classes, who expect the bottomless purse of the state to provide simultaneously higher wages, shorter hours, easier work and lower fares, would vote.

For my own part I shall greatly regret the change, which I believe to be inevitable. Not only because:

"Men are we and must grieve when even the shade
Of that which once was great has passed away,"

but because we shall lose, in my judgment, more than we can gain. I admit we shall gain something—a good deal perhaps. English business admittedly had grown slack—take the iron and engineering trades for instance—twenty years ago. Rule of thumb methods, antiquated machinery, neglect of cost accounting, and so forth, held undisputed sway. English business was effectually awakened by the severity of foreign competition. English railways are not exposed to foreign competition, and their methods still need modernization. The railway profession nowadays need the best brains and high scientific training. Our railways mainly recruit their headquarters staff from the rank and file. The headquarters staff of the civil service are the pick of the very best brains of the country. I cannot doubt that nationalization would *at the outset* lead to more scientific and, therefore, more economical operation.

I will concede another point and a big one. No nation has yet solved the problem of satisfactory state control of a private railway system. Our railways used to be pretty well controlled by competition. But competition is dying before

*An address delivered before Leeds Luncheon Club, Leeds, Eng., on November 16, 1914.

our eyes. There remain the Board of Trade and the Railway Commission. Nobody, I assume, supposes that they control the railways. The Royal Commission now sitting has shown no signs so far of having begun to think out a scheme of adequate control, or even of appreciating that such a thing is required. France used to have, under the name of *Comite Consultatif*, a really competent body of experts controlling its railways on the commercial side. But of recent years political pressure has greatly increased the membership of the committee till it has become an overgrown debating society, whose debates are not primarily conducted from the point of view of the public interest. As for America, high hopes were entertained not long since of the Interstate Commerce Commission. But its recent record has disappointed even its most fervent admirers. And at this moment the commission, having done its worst in impairing the credit even of the strongest companies, is occupied in eating with what grace it can a decision on the most important question ever submitted to it, which it pronounced after twelve months' inquiry as recently as last July.

Private railways must be controlled by the state. And when one admits that no state has yet discovered a satisfactory way of doing it, one may seem to have gone a long way in admitting the necessity for state ownership. And yet I still think that the balance of argument is definitely on the other side for two main reasons, financial and political. Though the doctrines of the Manchester school are out of fashion nowadays, it still remains true that the state cannot, or at least does not, conduct business as efficiently and economically as private enterprise. I have said that I believe that state management in this country at this moment would induce immediate economy. I have not said, and I do not think, that it would secure better public service. And I still believe that, if our railways remain in private hands, and have to work out their own salvation, they will be operated twenty years hence more efficiently than they ever would be by any government department. The largest part of the expenditure of a railway is the wages bill. Does anyone believe that the state gets as good value for £1 spent in wages as the private employer? Whether our English railwaymen are underpaid at present, I am not concerned to discuss. I only wish to point out that, under a state system, wages must go up sharply, and that the public will have to foot the bill.

It is in Prussia, if anywhere, that government railways are efficient. And yet I believe that any impartial expert, comparing Prussia with France, and taking into consideration the conditions, geographical, commercial, and economic, the service rendered, and the rates charged, would come to the conclusion that the French companies, hampered though they are at every turn by political interference, are managed more efficiently and economically than the Prussian state system. As for the exploits in disorganization of the French government since it took over the Western Railway, it is only kind to draw a veil over them, and say that things have been so bad that it is impossible that they should not get better. But, if the Prussian state cannot hold its own with the French companies, still less can the Australasian state railways face comparison with American companies. Comparing the efficiency of the Victorian or New South Wales railways with that, I will not say of the Pennsylvania, but of the Southern Pacific or even the bankrupt St. Louis & San Francisco, would be as absurd as comparing a blunderbuss with Lee Metford.

Even more important to traders than the quality of service given is the scale of rates charged. If our railways are nationalized they will need to earn much the same net revenue as at present; or else saddle a deficit on the taxpayer. Private companies naturally try to raise the necessary revenue with the minimum of economic friction. Their motto is "Charge what the traffic will bear." Drop the rates where the traffic cannot bear them; keep them up where the traffic can. Their goods manager is from his situation impartial between rival claims. By training he is an expert to know where the shoe most pinches. The state instinctively tends to broad general rules and a dead level of uniformity. And, in practice, at least in a parliamentary country, adjustments towards uniformity can only be downwards. And this means that certain individuals, in no way specially meritorious, will secure increased profits at the expense of the general public. Under a state system I have no doubt that rates would be reduced to a dangerous extent. It is emphatically untrue that reduction of rates always increases net revenue. If it were true, why do not the commercial companies reduce rates today? The famous apple woman who could afford to sell each apple at a loss because she sold so many lived in Ireland. And Ireland is an exceptional country.

I have left to the last what is in my mind the final and crucial point—politics. Under a state system, to quote the words of the famous Italian commission of thirty years ago, "Politics would corrupt the railways. And the railways would corrupt politics." The Italians since then have put the question to the test of experience, and have abundantly proved that the commission was right. I cannot attempt to give you the evidence. It is to be found all over the world, from Belgium and France to Argentina and Peru. Some samples culled from the records of our own Australasian colonies will be found in Sir Charles Owens' evidence before the Royal Commission. I have myself called attention to evidence from Canada and the Cape to the same effect. It is safe to say that no democratic state has ever yet succeeded in keeping railway management out of politics. In my belief no democratic state ever will. And it is because I believe that politics would corrupt the railways and railways would corrupt politics, not necessarily through money bribes but through the worse and more insidious bribery of votes, that I shall oppose government ownership of railways in England as long as the question remains an open one. But I fear I shall live long enough to say, "I told you so."

RAILWAY AFFAIRS IN OTHER COUNTRIES

The illustration shows a German troop train which was wrecked while running at high speed near Stendal, Geomany, when it ran into the rear of a freight train. The train was carrying soldiers who had recovered from their wounds to such

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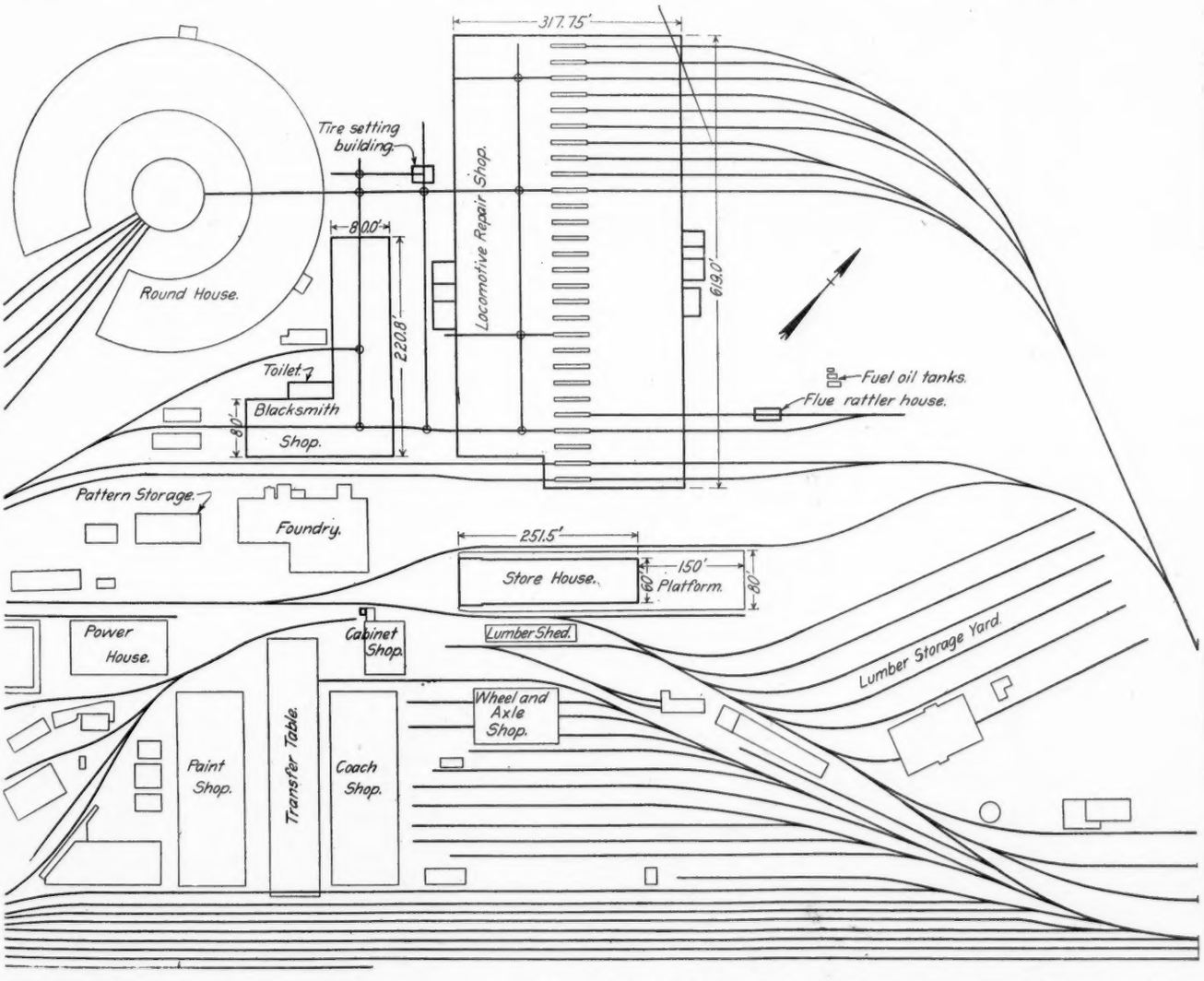
A German Troop Train Wrecked Near Stendal, Germany

an extent that they were returning to the French battlefields. The cars were telescoped and several of them totally wrecked, a large number of the returning soldiers being killed and seriously wounded.

New Chicago & Alton Shops at Bloomington, Ill.

Increased Facilities for Heavy Repairs Provided by Construction of Three Large Modern Buildings

The Chicago & Alton has maintained car and locomotive repair shops in connection with its engine terminal at Bloomington, Ill., for many years. When the necessity arose for increased capacity in these shops some time ago, the advisability of removing these facilities from Bloomington was considered, but to prevent this the city agreed to furnish the land necessary for the enlargement of the shops and yards sufficient to care for requirements for some time to come. The new buildings just completed on this land, which adjoins the old site on the north, comprise a locomotive shop, a blacksmith shop, a storehouse, a tire heating building and a flue rattler building. A number of unique features were introduced in the design of these buildings, notably the placing in one structure of the several departments of the locomotive shop and the improved layout of the blacksmith shop. The general layout provides not only for existing and probable future needs but for the utilization as far as possible of the old shops and for the development of a well defined scheme that will ultimately utilize the tract in the most economical and effective manner. The arrangement of the new buildings and their relation to the old buildings, the storage yard tracks and platforms are shown in the plan.



Layout of Chicago & Alton Shops at Bloomington, Ill., Showing New Buildings Recently Completed and Their Relation to the Yards and the Old Buildings

LOCOMOTIVE REPAIR SHOP

The locomotive repair shop is 619 ft. long and 317 ft. wide, covering an area of nearly 4½ acres. The building is divided into five longitudinal bays housing the erecting shop, the machine shop and the boiler and tender shop, as well as the master mechanic's and foreman's offices, tool rooms and sub-store rooms. This combination of the various departments under one roof without partitions admits of such an arrangement of tools that work and materials may pass through the shop in an orderly and progressive manner with the least possible rehandling.

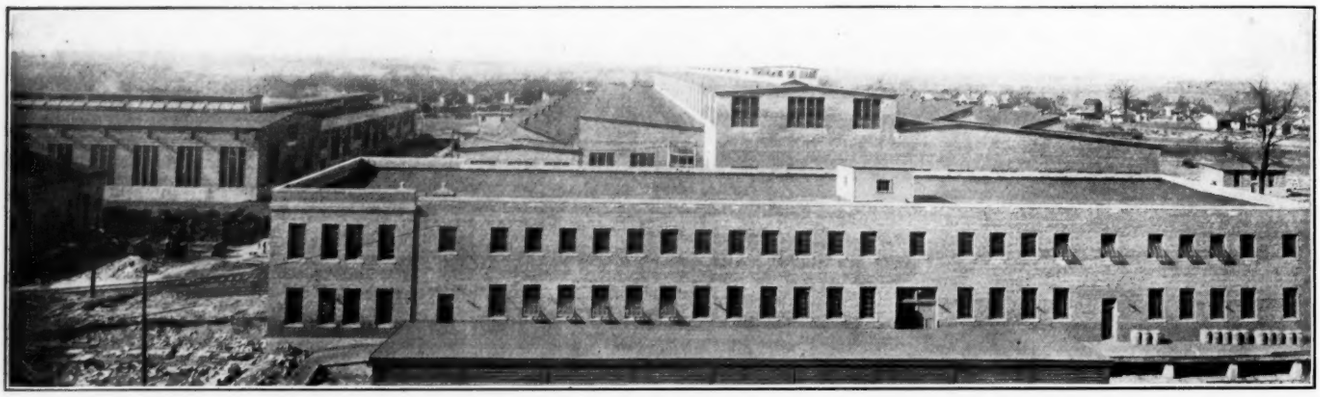
This building consists of a structural steel frame on concrete foundations with side walls of concrete up to the window sills and brick above that level, with the exception of the high walls of the central erecting bay which are of tile with stucco finish. The floor consists of a 4-in. sub-base of tarred rock well rolled and covered with a 1-in. layer of sand and tar in which is embedded an underflooring of 3-in. yellow pine overlaid by a

1 1/16-in. maple floor. The roof has wood purlins with 2-in. planks covered with prepared roofing. The building is well lighted as the combined window area of the side walls and the saw tooth and monitor roof construction amounts to over 28 per cent of the floor area. The artificial lighting consists of Tungsten nitrogen-filled lamps in 400-watt units spaced to eliminate shadows and the necessity for individual lamps on the machines except for inside work.

The shop is heated by an indirect blower system located in two specially constructed rooms outside of and immediately adjacent to the main walls of the shop and situated one on either side of the building about midway of its length. These rooms are large enough to be divided, a part of the space being used for lavatory and locker rooms for the men. The blower system consists of two 240-in. steel plate exhauster type fans direct-connected to horizontal throttling engines. These fans draw air through 20,200 sq. ft. of Vento heaters and discharge it through concrete underground ducts to register boxes located along the outside walls and on interior columns. The Vento heaters are supplied by high pressure steam transmitted from the power house about 1,000 ft. away at 125-lb. pressure, which is reduced in the fan room to 1½ lb. The exhaust steam from the fan engine is also used in the heaters. A suitable system of piping is provided for distributing live steam, compressed air, fuel oil and water for fire protection, drinking and hydraulic pressure throughout the shops.

The erecting bay, located in the center of the building, is 75 ft. wide, center to center of columns, and contains 28 pits. It is served by two traveling electric cranes on two levels, the crane for the unwheeling of locomotives being of 150 tons capacity equipped with two trolleys of 75 tons each located on the upper runway, while the lower runway carries a 10-ton messenger crane. On every alternate column between the erecting pits jib cranes are provided for handling materials on the front ends of the locomotives.

Adjoining the erecting bay to the south is a 60-ft. bay in which are located the heavy machine tools which are served by a 10-ton traveling crane. South of this bay is another 60-ft. bay in which are placed the lighter tools. The heavy tools are all equipped with individual motor drive, while the lighter ones are arranged in groups driven by motors of 20 to 25 hp.



Looking Over the New Chicago & Alton Shop Buildings, Store House in the Foreground, Blacksmith Shop to the Left and Locomotive Shop to the Right

North of the erecting bays are two 60-ft. bays devoted to boiler and tank work. These two bays are served by traveling cranes, one of 15 tons capacity and the other in the boiler assembling bay of 40 tons capacity, each equipped with two trolleys. The hydraulic riveter is centrally located in the boiler shop with a tower constructed especially for it and is served by its own 25-ton crane.

BLACKSMITH SHOP

The blacksmith shop is of brick and steel construction on concrete foundations similar to that of the locomotive shop. It is an L-shaped building 80 ft. wide, one wing being 200 ft. long and the other 300 ft. long. All the steam hammers, ranging in capacity from 300 lb. to 6,000 lb., are assembled in the 200-ft. wing, and the forges and small power tools in the 300-ft. wing. The roof trusses on the former wing are 10 ft. higher than those on the latter in order to provide the 30-ft. headroom required

General View of the Interior of the Locomotive Shop Taken from the Light Machine Bay

for the jib cranes and hammers. A space 100 ft. long has been partitioned off in the longer wing for use as a tinshop temporarily until this space is required for blacksmith work, when the tinshop will be removed to other quarters.

In the general design special care was taken to provide a layout that would afford opportunity for an orderly progression of the work through the shop, and ease and economy in transporting materials or parts to the point of final use in the locomotive shop with which it has suitable track connections.

Excellent ventilation is provided by the monitors in the roof in addition to the means for removing smoke and gases from the forges. A lavatory is located in the angle of the "L" in an addition just outside the main building, which includes both toilets and washroom facilities for the men.

STOREHOUSE

The two-story brick storehouse is located east of the locomotive shop and separated from it by a 95-ft. storage yard. This building is 60 ft. wide and 250 ft. long without a basement, the first floor being on an earth fill affording facilities for handling and storing heavy materials on a level with the car floors. A wooden platform 10 ft. wide on concrete piers extends the entire length of the building on both sides, and a large storage platform 80 ft. by 100 ft., with the floor laid on an earth fill, is provided at the north end.

Ample storage bins, arranged in transverse rows to give a maximum of light in the aisles, are provided in the house. The second floor, where the lighter materials are stored, is served by an electric freight elevator of 5,000 lb. capacity, while a chute is provided by which small packages made up on requisition can be transferred to the first floor for delivery. At one end of the building is provided office space for the general storekeeper and his clerks, adequate toilet facilities and a first-aid hospital.

To permit the erection of the new buildings and the laying of some of the tracks it was necessary to remove two rather old buildings of stone masonry. These were of considerable size, one of them being two stories high, but they were successfully moved with their contents intact.

These new shop buildings were designed and constructed by Westinghouse, Church, Kerr & Co., New York, acting in cooperation with H. T. Douglas, Jr., chief engineer, and J. E. O'Hearne, superintendent of motive power of the Chicago & Alton, the actual field construction being in charge of P. J. Watson, assistant engineer.

COMBINATION THROUGH CLASSIFICATION AND TERMINAL YARD*

By W. C. Copley

Freight Trainmaster, Pennsylvania Railroad, Altoona, Pa.

The following description covers actual practice in a supposedly well designed, operated and organized yard—a main line yard on the Pennsylvania Railroad located between Chicago and New Jersey, consisting of more than 200 miles of track and having standing room for over 10,000 cars; it handles 6,000 cars per day of through business, about equally divided as to directions, and 3,500 inter-yard movements exclusive of the through business; that is, cars to and from the shops, transfer warehouses, and industrial and public delivery sidings. This makes it a combination through classification and terminal yard. The 6,000 cars of through business means that that number of cars are despatched from the yard, or in other words the cars are counted only once on the outgoing trip. The terminal or inter-yard movement of 3,500 cars per day represents each movement of a car within the yard after it has been classified and placed in the classification yard up to the time it is returned to the hump for a re-classification for final despatching from the yard.

When a train arrives in the receiving yard, the road conductor delivers his card manifests to the assistant yardmaster in charge of the movement in the direction the train is going, who counts the manifests and marks on his train register the engine number, the arrival time in the receiving yard and the number of manifests representing cars in the train. The manifests are then turned over to the assistant yardmaster's clerk, who takes out any for cars he may have "hold" or "change" orders for. He also takes a book record of all the city delivery cars in the train. The manifests are then turned over to the reconsigning clerk, located in the same office, who represents the freight agent. This clerk picks out those for any bill-of-lading or reconsignment cars he may hold orders to rebill. About 200 cars per day of this class of freight pass through the yard, 75 per cent of which are changed or re-billed before the cars are classified, while the remaining 25 per cent go to the hold-track to await disposition. The manifests are next turned over to the conductor or car-marker, who takes them into the yard, passes along the train and compares the numbers and initials with the cars as they stand to make sure that each car is represented by a manifest.

While the manifests are being thus handled the car inspectors make a thorough inspection of the train under blue flag protection, making any slight repairs which can be made in the receiving yard, and marking for the shop any cars with defects that cannot be thus repaired. As the car marker compares the manifests with the cars in the train, he chalks the front end of each car for the track on which it is to be placed in the classification yard beyond the hump; he faces down the manifests for any cars he may mark for the shops. Upon returning to the assistant yardmaster's office he makes out a shifting slip for the use of the leverman in the tower, who operates the switches from the hump to the classification yard; he then removes from the pack the manifests for cars for the shop, sealing them in an envelope marked "Shop cars out of train of Engine ———." The manifests for the other cars are sealed in a separate envelope, which shows the engine which brought the train to the yard, the number of the track on which the train was received, and the time it was marked. He then pins his switching slip to the envelopes containing the manifests and places the entire pack in a pigeon-hole in the assistant yardmaster's office, representing the track in the receiving yard that the train is on.

The train is now prepared for classifying over the hump. The manifests are given to the man in charge of the hump engine; the engine is placed back of the train and the manifests are delivered to the conductor in charge of the hump, who in turn delivers the switching card to the leverman, and forwards the manifests for the train, still sealed in the envelope, to the assistant yardmaster at the despatching end of the yard; he sorts the pack, placing the manifests in pigeon-holes representing the tracks on which each respective classification of the various cars in the train is made. The manifests for shopped cars are turned over to the shop car clerk in the tower at the hump; it is his duty to take a book record of the face of the manifest, including the date, the number of the engine bringing the train into the yard, and the time the train was shifted, which, of course, gives the time the car was delivered to the shop.

The shop cars are delivered direct from the hump to the interchange track between the main classification yard and the shop repair tracks. A shop engine then places them on the repair tracks, which hold from 15 to 25 cars each. The shop car clerk takes the numbers of the cars standing on the repair tracks and then returns to the tower, picks out the manifests for the cars undergoing repairs, as they stand on the repair tracks, and marks on the back the number of cars on the track, as well as the track number on which the cars stand, checking cars already entered in the book as going to the shop, giving the time and date. After the cars have been repaired, the shop engine pushes them out through a depressed track beyond the hump; the hump conductor goes to the tower and gets the manifests representing that track, chalks the cars for their respective tracks and makes out a shifting slip the same as had been done

*Received in the contest on The Operation of Terminal Yards. Other papers in this series appeared in the issues of October 9, October 16 and October 30

in the receiving yard. The shop train is then re-classified over the hump the same as a through train. Not a single manifest for a shop car has been lost at this point in the ten years this system has been in force.

The manifests for the city delivery cars, including those containing material for the shops, are sent by messenger to the agent at the transfer station as soon as the train is marked, and a "put-card" is issued for each car in place of the original manifest. It indicates for whom the car is to the yard conductor, and on what particular industrial siding or shop track the car is to be placed. This gives the freight agent an opportunity to make out his freight bills and notify the consignee that his car has arrived with the approximate time it will be delivered on his siding, which is about six hours after arrival in the receiving yard.

The shifting service for the inter-yard movement is divided into districts, and each conductor in this service is regularly assigned his work for the day. Each crew is responsible for the proper and prompt performance of service assigned to it.

The yard is divided into seven districts, each under the supervision of an assistant yardmaster, who is responsible for the performance of crews while in his territory. In addition to these assistant yardmasters there are two yardmasters, one eastbound and one westbound, whose duty it is to pass from one to the other of the assistant yardmasters' districts and see that they are properly performing their duties, and to relieve any congestion that may occur at any point. Day after day these crews perform the work assigned without receiving a single order from a yardmaster or an assistant yardmaster. However, if at any time, the work assigned a crew should be lighter than usual, the conductor when he gets through his work is required to report promptly to the yardmaster, in which case he will be used in any service in any portion of the yard where he may be needed. Six day crews and four night crews are engaged in this inter-yard service, while the through business is much greater in volume; it is less difficult to handle, except that about 1,800 cars per day must be weighed. In the westbound yard, where 60 per cent of the cars handled are empty, it has been found necessary to maintain what is termed a perpetual record of empty cars as they stand on the classification tracks. This record is made by the assistant yardmaster at the hump end of the yard, who counts the number of cars for each classification track as shown on the switching card when the train is started and classified over the hump. He adds the number of cars for each track to those already standing on the track, while the clerk at the despatching end of the yard telephones the assistant yardmaster at the hump the number of cars taken off of each one of the tracks at the despatching end. The assistant yardmaster subtracts this from those already shown on the card. This gives the exact number of cars on the classification tracks at all times. This record has been running for 14 years, and provides the same check on the number of cars on each track as if they were loaded cars with manifests. In addition to the through business passing through the westbound yard about 400 empty and 100 loaded cars originate daily on the industrial and track delivery sidings, coal wharves, shops and transfers, etc., all of which are delivered to the loaded or empty receiving yard by yard engines and are classed as inter-yard movements.

The yard is equipped with advance or departure tracks in both directions. The trains are made up exclusively by yard engines in the classification yard and are hauled to the advance tracks, there being no attempt to couple the air hose or to make any minor repairs until after the trains have been delivered to the advance tracks. Protecting the train with blue flags at either end, a force of air brake inspectors then takes charge, tests the air, and makes such minor repairs as can be made on these tracks, holding the air pressure on the train until the arrival of the road crew and until the engine is attached. It is only necessary for the road crew to make a service application of the air, as the inspectors have given them information as to the number of air brake cars in service and the number of cars, if any, on which the air is cut through.

Two men, known as car tracers, cover all the hold-for-order industrial, team and M. W. tracks, and all outlying sidings twice each 24 hours, thus avoiding an unnecessary delay to cars for any reason, such as awaiting an agent's "put-card," errors on the part of the car markers or the men making out the put-card, as well as furnishing the necessary information for the demurrage charges where the car is held in excess of the specified time by the consignee or consignor. Through and local records are also maintained in the office of the assistant freight trainmaster, who is in direct charge of the yard. The through record is taken from the incoming conductor's car report, while the outgoing record is taken from the yardmaster's record of the cars despatched, thus giving the arrival and departure of all through cars. The local record represents every movement the car makes in the yard. This information is taken from a conductor's report, which gives the detailed movement of every loaded or empty car handled during the day.

It may seem that the matter of economy has not been taken into account in the organization and operation outlined, but comparisons made with other yards handling a similar class of business, have shown that the cost per car passing through the yard is a few cents less than where the organization is less extensive and the car records are not so systematically maintained. While the cost per car over the hump is low in comparison with other points, it is no doubt largely due to the fact that by systematically operating the advance tracks, the classification yard is kept free, thus enabling the hump to perform a maximum amount of business each day. Another factor in the economical operation of humps is a car checker located on each hump, whose duty it is to record the man on each draft of cars over the hump throughout the day. This checks each car dropper in the proper performance of his duty. In addition it locates responsibility for any damage to cars in the classification yard which has not been reported by the car dropper.

Another economical feature of the operation is that all switches on the humps (of which there are four, two in either direction), are equipped with electro-pneumatic direct-movement push-button machines, as well as fog horns or air whistles of different tones located in each one of the receiving yards, which enables shifting operations to be continued during foggy weather. Because of the efficient lighting of the yard at night, there is little difference in the amount of business handled and the cost of operation night and day. In the hump yard for empties, where the maximum volume of business per day is slightly in excess of 3,000 cars, a searchlight with diffusing lens is so located that the rays cover the entire classification yard of 31 tracks, without the annoyance or inconvenience of changing the position of the lamp at any time. The installation of this lamp increased the efficiency of the hump about 12 per cent, which brings it almost up to the efficiency of the same hump in daylight.

The selection of yardmasters and their assistants is carefully made from men who have been trained in yard work and who have displayed special ability, not only in yard operations, but in handling men and supervising the work. One of the most valuable features of the organization is the harmony existing throughout, there being no disposition on the part of any yardmaster or conductor to shift responsibility or unload work from one yardmaster's district to another. This may sound peculiar among railroad men, but nevertheless it is a fact. I don't mean to say that this harmony is voluntary in all cases, but it is insisted on by the officers directly responsible for the organization and operation of this particular yard.

BRITISH RAILS ABROAD.—The external demand for British rails has been scarcely maintained this year, the exports to November 30 having only amounted to 419,125 tons, as compared with 459,870 tons in the first eleven months of 1913, and 377,878 tons in the first eleven months of 1912.

The Bankers and Equipment Trust Certificates

The Investment Bankers Recommend More Stringent Restrictions on the Issue of Equipment Trust Certificates

The following report on railroad bonds and equipment trusts was presented by one of the committees at the annual meeting of the Investment Bankers' Association, held on November 12.

When the committee on railroad bonds and equipment trusts was first formed in 1912, the committee as then constituted took up, by correspondence with the principal trust companies in New York, Boston, Chicago, Philadelphia, etc., who had acted as trustees under indentures securing equipment trusts, what was the general practice of these trustees to provide for the maintenance by the railroads of the equipment pledged under such trusts, for the replacement of equipment worn out, lost or destroyed, and what steps these various trust companies took to keep themselves advised as to the condition of the equipment pledged under the trust. At that time it was found that there was no general course of action common to all the trust companies. In some cases the trust companies used definite forms for periodical reports on the condition of the equipment, but the amount of responsibility assumed by the trustees varied from an honest effort to protect and maintain the value of the security pledged for the equipment trust, to a position assumed by one company that it had no responsibility whatever for the security underlying these equipment obligations, and that it did not consider it part of the duty of the trustee to see that the covenants of the trust were carried out. On the whole, however, it was clear that the trust companies were using their best efforts to protect the investor in equipment trust obligations, and that the difficulties which they had to overcome were largely due to the fact that the banking houses who originally purchased the equipment trust had not been insistent that specific agreements be included in the indenture which would enable the trustees to obtain the necessary information from the railroads as to the condition of the equipment pledged; and secondly, if it was found that the railroad was not maintaining the equipment properly, the trustees had no power to force the railroad to maintain or replace the equipment by declaring a default under the indenture.

The whole question of equipment trusts and the sufficiency of equipment as security for an equipment trust is one which goes into the very heart of the theory and the practice of railroad accounting, bringing with it questions as to what is adequate maintenance and what is the true value from time to time of equipment through its depreciation year by year.

While conditions affecting the management, auditing and financing of the corporations of this country have undergone many changes during the past few years, all of which changes tend to safeguard and protect the interest of the investor in the securities of these corporations, and while there has been a growing realization of the obligation of the trustee to the public, yet the development of the indenture securing railroad bonds and equipment trusts has been along lines to make these indentures more and more flexible and more and more of a character to enable the borrowing corporation to best serve its own ends rather than to protect the interest of the investor. The whole theory of the equipment trust which was based on an original cash payment of 20 per cent with a loan maturing in not more than 10 annual instalments and with the title to the equipment remaining at all times in the hands of the trustee or banker making the loan has changed till now we have equipment trusts running 15 years or longer with 10 per cent cash paid in instead of 20 per cent, with the title of the equipment being held by a corporation or by individuals who are nothing else but the railroad itself acting under a different name; and in one case an equipment trust has been issued by one of our most important railroads, over $1,000,000 of which are outstanding at the present time in the hands of the investor, where the title to the equipment has reverted back to the railroad against each instalment of principal paid, which vitiates the fundamental principle of equipment trusts.

PROVISIONS TO BE INCORPORATED IN THE EQUIPMENT TRUST INDENTURES

The principal matters which need to be especially considered in the drawing of equipment trust indentures, group themselves under the following heads:

I. *The Proper Vesting of Title in the Trustee to the Equipment Pledged under the Equipment Trust.*—This problem is one of the most important, and no matter how well the actual indenture may be drawn, if it does not sufficiently cover this important detail, the safety of the investor is not fully provided for. The trust has to be protected against three classes of persons: (a) Attachments and judgment creditors of the railroad company. (b) Purchasers for value and subsequent mortgages of the railroad company. (c) Prior mortgages which contain the usual after-acquired property clause covering rolling stock.

As to the first two, the existing special rolling stock recording acts which have been passed in practically every state and in Canada, protect the trust against these classes of claimants if the trust agreement is properly recorded; but here we run into a difficulty, inasmuch as cars are moved all over the United States and Canada in the ordinary course of business, while the company which owns the cars may have lines only in one or two states. It is not the custom to record the agreement of a company whose line is solely in New York for instance, in every state, and the question arises as to whether title to these cars will be properly protected in other states in case they were sold there to a purchaser without notice, or caught through attachment.

With regard to prior mortgages containing the after acquired property clause, the important thing is to make perfectly sure that the title to the equipment vests in the trustee of the equipment trust before the railroad acquires any title whatever thereto; for it is obvious that if, for instance, a railroad company constructs or acquires cars and thereafter, by arrangement with bankers and a trust company, goes through a form of then making a conditional sale or lease to the railroad, the transaction instead of being a real conditional sale—in which case the title to the equipment comes to the railroad subject to the prior lien of the equipment trust—is rather in the nature of a chattel mortgage, and being made subsequent to the railroad's existing mortgages, gives to the trustee of the equipment trust only a junior lien and not a first lien on the cars pledged. It is therefore extremely important always to provide that no part of the equipment to be covered by the trust shall be delivered to the railway company prior to the execution and filing for record of the agreement, and in your committee's opinion also, the agreements for the construction of the cars should be made directly between the car manufacturers and the bankers or the trustee of the equipment trust.

Of recent years a great deal of laxity seems to have become prevalent with respect to these details, due largely to the fact that it is usually extremely inconvenient to the railroad company to go through the necessary steps which are involved in the process of preventing the title from vesting prior to the execution and recording of the trust. In addition various schemes have been prepared by which individuals or car companies acquired cars from time to time for the uses of a particular railroad, arranging for leases of the same to the railroad and thereafter selling equipment leased certificates to bankers. Although this practice has become quite common, these arrangements are open to question on the ground that these individuals are usually either the railroad itself in a different form, the stock of the

car company usually being owned by the railroad company, and the individuals being agents of the railroad company and not representing anybody else.

We do not refer here to the so-called form of equipment trust issued under what is commonly known among bankers as the Philadelphia plan, but to certain other forms of trusts in which individuals appear as the lessors. We have gone into this question at great length because we feel that while the investor has, up to the present time, been fortunate in the very few defaults which have occurred under equipment trusts, with the changing conditions now confronting the railroad industry, it is of the utmost importance that in the future more than usual care be taken in the drawing of these indentures and in the protection of the investor. Through long practice and a feeling of false security arising from the fact that there have been so few defaults of equipment trust in the past, both the investment banker and the investor has become careless in his investigation as to the form of the indenture, under which the equipment trusts which he purchases have been issued.

II. *Maintenance of Equipment.*—The maintenance of equipment pledged under the indentures at all times in good workable order and the replacement of worn-out, lost or destroyed equipment, appears to the committee to be a phase of this question which should receive much more careful attention than has been accorded to it in the past. While we realize that almost all equipment trusts have provision in the indenture requiring that equipment shall be maintained or replaced, it has unfortunately not been the practice of many trustees or of the banking firms handling equipment trusts to require of the railroads that these provisions in the indenture shall be lived up to, and to insist that the railroads officially perform the obligations that they originally agreed to. During the past year a number of situations have arisen where when a railroad has got into or was facing financial difficulties we have found that the equipment pledged under the equipment trusts has become so depreciated in value as to seriously impair the security of the trust certificates issued against it. When cars were lost or destroyed, new equipment has not been added. When cars have been withdrawn from service owing to their bad condition, these cars have not been repaired and their value maintained. New equipment has been bought by means of the issuance of additional new equipment trusts, while needed repairs on equipment already owned have not been made, which repairs, if they had been made, would not have made the purchase of additional equipment necessary.

The necessity of a road making as good a showing as possible of net earnings in order to preserve credit for additional borrowing has tempted roads to resort to capital expenditures rather than to maintenance charges, which being charged to operating expenses would in turn be reflected in their statement of net earnings. In order to prevent such practices, your committee deem it wise to have regular reports made to the trustee by the railroads, covering the condition of the equipment pledged, and we strongly urge that the investment banker face the responsibility accruing to him when he handles equipment trusts to see that these reports by the railroads are made to the trustees; that the trustees keep accurately informed as to the value of the equipment from time to time, and that in case the value of the equipment is not maintained by the railroads, the trustees be placed in a position to take such action that shall conserve and protect the interest of the investor.

III. *Handling of Payment of Principal and Interest.*—One of the fundamental principles of an equipment trust is that each six months or each year a certain proportion of the certificates outstanding shall be paid off and retired, so reducing the amount of indebtedness against any given amount of equipment pledged. In this manner the depreciation of the equipment is offset as far as the security of the loan is concerned by a reduction in the amount of the indebtedness against such equipment. The committee has found, in looking into a number of these indentures, that no provision has been incorporated in the indenture to prevent the extension of such maturing obligations, and we strongly recommend that a clause be included in indentures which will prevent such extension. In order to safeguard against this practice we believe that the necessary funds sufficient to pay the principal and accrued interest of notes as they may become due should be deposited with the trustee to be used for the payment of such notes, and that when such notes are paid they should be canceled and no notes in substitution of them issued. It is of the utmost importance that no purchase or sale of notes or advances upon the same shall operate to keep equipment notes alive after maturity, nor should the railway company extend or consent to the extension of the time of the payment of the principal or interest of any equipment trust.

IV. *Enforcing Clause.*—In order that the trustee may be placed in a proper position to protect the investor, it is necessary that an enforcing clause be included in the indenture, which will enable the trustee to declare a default if the provisions of the indenture are not lived up to by the railroad company.

The committee also strongly recommends that when an equipment trust is drawn, provision be made that the trustee shall be given full and complete drawings describing the equipment pledged so that in case of default the trustee may have a full record and complete information to enable it to effect sale of the equipment or to take such other steps as it may deem wise for the protection of the trust.

THE OBLIGATION OF THE INVESTMENT BANKER

The committee feels that it is necessary to enlarge on one most important phase of this question which must be self-evident to all. The value of the collateral under any loan and the maintenance of the value of such collateral can be safeguarded to a certain extent by the terms of the indenture, and by establishing through the pressure of well directed public opinion an active oversight by the trustee of the methods pursued by the railway company in living up to the terms and spirit of the indenture.

This, however, is but a means to the desired end. Eagerness to do business bred by over-keen competitive conditions has led many of us in the past into situations where securities have been bought and sold before sufficiently careful intelligent investigation was made of the terms of the indenture, and perhaps what is of even greater importance, without thoroughly considering the moral risk involved in the loan arising from the methods and character of the management of the borrower.

The responsibility of the investment banker does not cease with the sale of the equipment trust certificates to his clients. It is the part of wisdom to investigate at regular intervals whether his and his clients' interests are being properly safeguarded both by the railway company and by the trustee. "A stitch in time saves nine" says the old adage and the investment banker could many times have prevented the difficult and unpleasant situation confronting his client and himself if he had followed the useful course of doing what he could to prevent the loss by consistently and regularly keeping himself advised as to the true situation and value of the equipment pledged from the time he assumed the responsibility of the loan by placing it with his client.

The greatest evil today in connection with the problem of equipment trusts, the investment banker and the investor is this neglect of investigation and regular oversight. If our members will make themselves familiar with what provisions should be included in a properly drawn indenture securing equipment trusts, if they will refuse to handle equipments unless the indenture be properly drawn, and if they will continue to guard their clients' interests regularly and systematically after they have placed the issue by seeing to it that both the trustee and the railway company live up to the terms of the equipment trust agreement that both entered into, then, they will make it difficult for many of the evils to exist which are now confronting our profession of investment bankers.

German Iron Ore Production.—Germany's iron ore production for 1913 is given by Stahl und Eisen as 35,941,285 metric tons, having a value of 3.71 marks (88.2 cents) per ton, as compared with 33,711,142 tons in 1912 with a value of 3.73 marks (88.7 cents) per ton.

A Study of Combustion in Locomotive Fireboxes

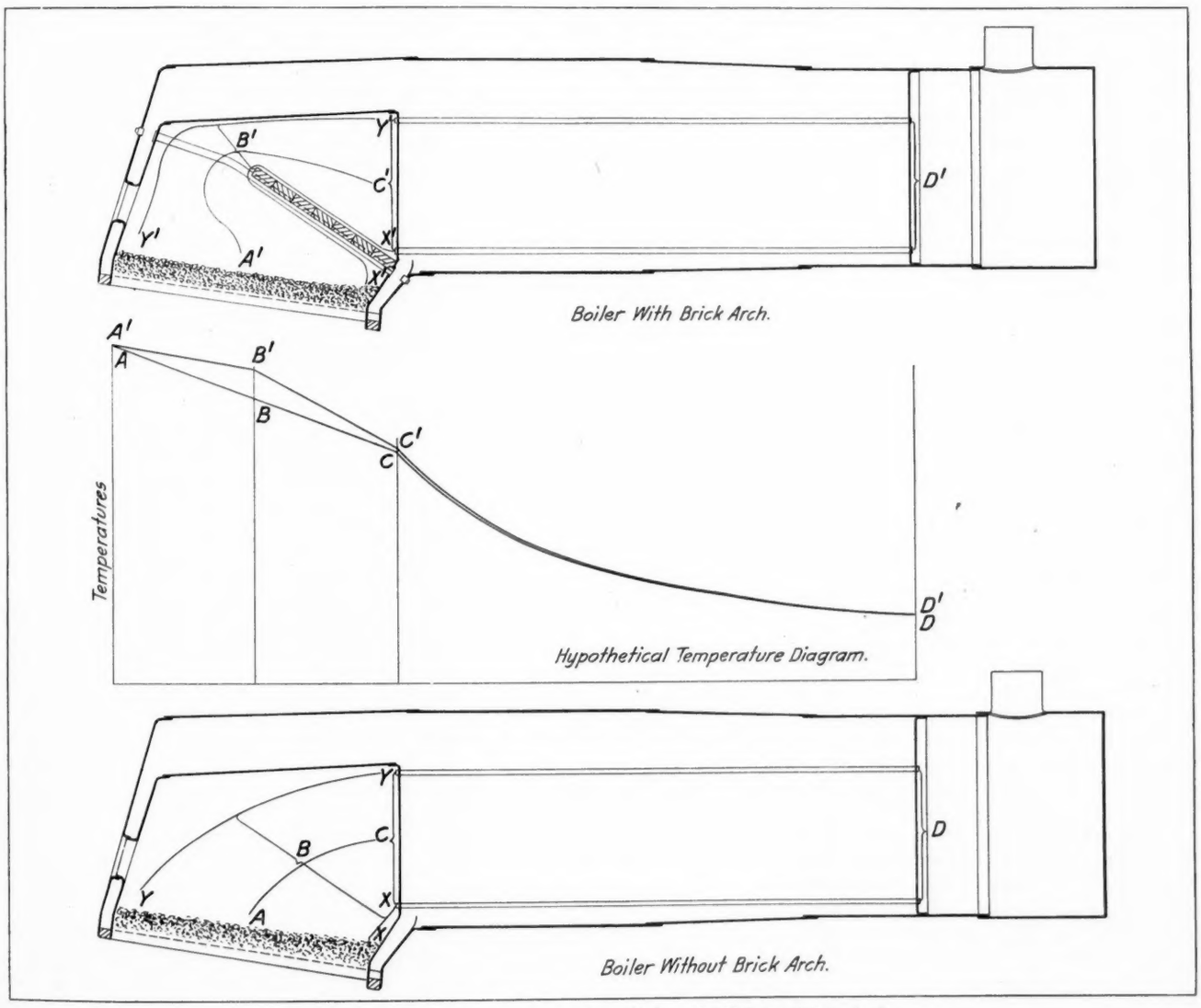
Effect of the Brick Arch and Its Supporting Tubes; Factors Which Should Be Considered in Firebox Design

At the railroad session of the annual meeting of the American Society of Mechanical Engineers, held in New York, December 2, 1914, J. P. Neff, vice-president, American Arch Company, New York, discussed the Brick Arch and Circulating Arch Tubes, and J. T. Anthony, manager of the service department of the same company, read a paper on Firebox Design. These papers are presented in abstract below:

THE BRICK ARCH AND CIRCULATING ARCH TUBES

J. P. Neff.—About ten years ago, when I began devoting my whole attention to the subject of locomotive brick arches, a somewhat careful canvass of the situation in regard to this subject on American railroads revealed that a very few roads were consistently using brick arches; a much larger number were tolerating them in a very small percentage of their engines, and a still larger number had discarded them entirely. Many of the mechanical officers of those roads tolerating arches in a few locomotives expressed themselves in terms unfavorable to the arch, but admitted that they were forced to use them on certain engines; that is, on engines handling the important trains in exacting service or on hard schedules. This was in order to have available all the boiler capacity possible.

All modern locomotives, or at least practically all those built in the last few years, have been built to haul heavy steel passenger trains on hard schedules or to meet exacting conditions in other kinds of service. As the locomotive itself has been greatly improved and refined in the last ten years, so has this special device, to the end that it has been shorn of many of its original faults, leaving its never disputed virtues standing out all the more prominently. The brick arch insures more nearly complete combustion. The combustion of high volatile coal at the rapid rates necessary to meet the demands for large hauling capacity today is fraught with considerable losses due to incompleteness. That represented by the CO content in front end gases is only a part of it. The losses from the incomplete combustion of hydro-carbons may easily be four times that represented by the CO per cent in the gas analysis. Anything that will mitigate these losses without introducing too high air excess reflects at once in higher furnace temperatures. The introduction of the combustion chamber helps by lengthening



Temperature Diagram for Firebox With and Without Brick Arch

the flame travel, a very important thing, but the introduction of the arch, especially the arch on water tubes, not only doubles the average length of the flame travel, but in addition possesses the more important virtue of being a mechanical mixer.

The eminent authority, Dr. Breckenridge, says in his treatise entitled A Study of 400 Steaming Tests: "Mere length of combustion chamber counts for little compared with some device for thoroughly mixing the gases of the flame stream; one good mixing wall or baffle is probably worth many feet of undisturbed flow." A study of the full text of the work of Dr. Breckenridge impresses one with the thought that the above-quoted statement was not made with the intention of belittling the importance of combustion chamber length or flame length, but with the idea of emphasizing the importance of mechanically mixing and jumbling the different strata or ribbons of the gas stream.

By fostering or enhancing combustion above the fuel bed in this way considerably more heat is evolved and higher firebox temperatures result. Authentic tests have shown that with certain coals this increase in firebox temperature may be 15 per cent; yet, as a rule, these higher firebox temperatures are not accompanied by higher front end temperatures. This is explained by the fact that the tube supported arch by virtue of its position performs another important function, that of forcing these higher temperature gases to sweep or brush at considerably increased velocity a considerably greater area of evaporating surface; not only the added area of the arch tube surface, but much surface of hitherto unswept firebox plate, so that the double result is accomplished, of creating more heat, and causing to be absorbed this increased amount of heat, giving a net result of increased boiler output for the same amount of coal consumed, a distinct advance or rise in the boiler efficiency. The illustration for fireboxes with and without the brick arch gives a hypothetical temperature diagram.

The circulating tubes or arch pipes play no small part in this. Not only do they present by far the most effective heat-transmitting surface, but the circulating effect in itself is very important, especially at high rates of evaporation. Just as the particles of gases must quickly touch the heat absorbing surface and give way instantly to other particles, so must the water, or steam film, on the opposite side of these surfaces give way quickly to other particles of water, if a high rate of heat transfer is to be accomplished. Expedited circulation will insure this favorable condition. A locomotive boiler can no more give high duty per pound of weight or square foot of heating surface when the gases move leisurely over its surfaces and through its tubes than can the locomotive as a whole give high horsepower in a slow turning of the wheels.

Arch tubes, as they are now, give much aid, but there is still more to be done in this direction. Arch tubes or circulating water tubes through the firebox may be used in still greater number with good results, if properly arranged and disposed, so as to aid in mechanically mixing and in circulating without too quickly lowering the temperature of the gases. We have information from three different authentic sources that the locomotive brick arch, together with its circulating water tubes, can be counted on to produce an increase in maximum boiler capacity of approximately 15 per cent. The four 3-in. arch tubes reported on from one of these sources of information were held to be responsible for one-third of this increase. It is fair to assume that further progress is possible in one or the other, or both, of these features.

FIREBOX DESIGN

J. T. Anthony.—The boiler is the power plant of the locomotive, and the firebox, in addition to its furnace function, is also responsible for a large part of the evaporation, this varying from 30 to 50 per cent of the total. The principal points to be considered from a furnace point of view are grate area, flameway or volume, firing clearance and air supply. From the boiler point of view, we must consider the extent and location of the heating surfaces.

In order to secure high efficiency, the grate area should be sufficient to keep the maximum rate of combustion below 100 lb. of coal per square foot per hour at full boiler capacity, as the losses, due to imperfect combustion, cinder discharge, front end gases, radiation and those unaccounted for, increase rapidly above this rate, with a corresponding decrease in boiler efficiency.

The Master Mechanics' Association, in 1897, recommended a ratio of heating surface to grate area of 60 for bituminous coal locomotives; but this ratio on the modern superheater locomotives ranges from 70 to 80, or even higher. This is due in part to the decrease in coal consumption brought about by the introduction of the superheater, and in part to the prevailing idea that large grates in addition to requiring more coal for firing up waste more coal when standing idle. It is possible, however, that the higher efficiency due to the large grate and low rate of combustion will more than offset the larger amount of coal used when firing up and standing idle.

The high efficiency at lower rates of combustion is due not only to a reduction in the heat losses enumerated above, but also to the relatively large proportion of the total evaporation that takes place around the firebox. Most of the heat received by the firebox heating surfaces is radiated directly from the fuel bed and luminous flames, only a small amount being due to convection or direct contact. The amount of heat received by radiation depends on the area of the radiating surfaces and the difference in temperature between the radiating and cooling surfaces.

The tubes receive their heat by convection, and the amount of heat so received, other things being equal, depends on the weight of the gases going through the tubes. This varies with the rate of combustion, and as the rate of combustion increases, the tube evaporation increases. Under the same conditions, the firebox evaporation increases to some extent, due to the slightly higher temperature and the increase in the mass of flames, but not nearly so fast as the tube evaporation.

High firebox evaporation means high boiler efficiency, for the high heat absorption by the firebox reduces the temperature of the gases entering the tubes; and for any one boiler, the temperatures of the gases entering and leaving the tubes are directly proportional when reckoned above steam temperature. Hence a lower temperature of entering gases means lower front end temperatures and an increase in efficiency.

A large percentage of the bituminous coal burns above the grate as gas. The rapidity and completeness of the combustion of these gases depends on the amount of oxygen present and the thoroughness of the mixing. In a firebox with 60 sq. ft. of grate, with a rate of combustion of 60 lb. of coal per square foot of grate per hour, an air supply of 20 lb. per pound of coal and an average firebox temperature of 2,000 deg., the volume of the gases evolved is about 1,200 cu. ft. per second. A firebox of this size would have a capacity of about 200 cu. ft., and would have to discharge and be refilled with gases about six times per second. The average time available for combustion of each particle of gas would then be about one-sixth of a second, and this is insufficient for complete and proper mixing by diffusion. With the short time allowed, it is necessary to mix the gases by mechanical means, and this is generally accomplished by an arch or baffle which forces the gases to pass through a restricted area, this area being not less than the net tube area.

It is evident that mere firebox volume is not sufficient of itself, and it is necessary to have a flameway of such cross section and length as to intimately mix the gases and provide sufficient space for burning before the gases reach the tubes. In an ordinary firebox, without baffle or combustion chamber, the average length of flameway is only 5 to 6 ft. By the introduction of baffles and combustion chambers, this length can be increased to from 10 to 15 ft., which results in not only more complete combustion but also in increased radiating surface, with a corresponding increase in firebox evaporation and a lowering in temperature of the escaping gases.

A Pacific type locomotive with 55 sq. ft. of grate area, a tube-

supported arch and an average flameway of 8 ft. had an average firebox temperature, covering a range of 25 tests, of 2,100 deg. This temperature was taken at the center of the firebox at about the end of the arch. The temperature of the gases entering the tubes showed an average of 1,725 deg., or a drop in temperature of 375 deg.

Another Pacific type locomotive with the same size grate and a tube-supported arch, but with a combustion chamber 3 ft. long, giving an average flameway of 11 ft., showed over the same range of tests an average firebox temperature of 2,185 deg. with the temperature of the gases entering the tubes of 1,485 deg., or a drop of 700 deg. between the center of the firebox and the tube sheet.

We obtain high efficiency at low rates of combustion in spite of the large air excess which generally accompanies. This is due to the fact that at low rates the firebox absorbs a larger percentage of the total heat evolved, and the amount so received for any one firebox depends primarily on the temperature of the fuel bed. It is possible that this temperature is higher with large air excess than with the lower, as the temperature is due to the rapidity of combustion which in turn depends upon the scouring and cutting action of the air blast.

The firing clearance, or the vertical distance between the fuel bed and the lower tubes, or arch, has been materially increased by the introduction of modern types of locomotives with trailing trucks, as this has permitted the firebox to be placed behind the drivers and the grates dropped lower. This one step has probably offset to some extent the high ratios between heating surface and grate area which are found in modern locomotives. The extent of the firebox heating surface is determined largely by the size and location of the grate; but there is no fixed relation between heating surface and grate area, or between firebox and boiler heating surface.

As stated above, the firebox evaporation depends primarily upon the extent and temperature of the radiating surfaces and not on the extent of the firebox heating surface. Increasing the firebox heating surface without increasing the grate area or flameway will result in very little increase in evaporation. Its only effect is to reduce the amount of heat absorbed by each unit of surface, with a slight reduction in the temperature on the fire side of the surface. An evaporation of 60 lb. of water per square foot of firebox heating surface per hour requires a difference of less than 100 deg. between the water and the fire side of the sheet, and if sufficiently high firebox temperatures or sufficiently large radiating surfaces could be obtained, it would be possible to materially increase even this high rate of evaporation without forcing the heating surface to its capacity.

In the Coatesville tests, conducted by Dr. Goss, the two fireboxes gave an evaporation as high as 58 lb. of water per square foot of heating surface per hour; but there was practically no difference in the total amount of water evaporated by each of the fireboxes when working at the same rate of combustion and with the same grate area, notwithstanding the fact that one of them had 12 per cent more heating surface than the other.

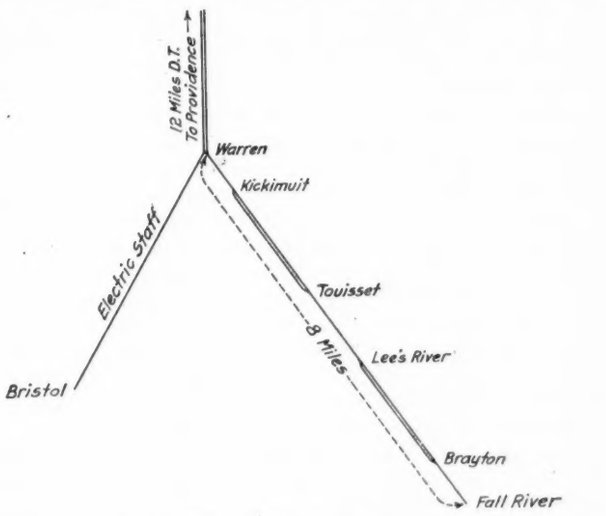
Judging from the past, we are not apt to see any radical departures from the present type of firebox in the near future, unless the nature of the fuel is materially changed, and the writer believes that any improvement in the efficiency of this part of the locomotive will be obtained by paying particular attention to and making ample provision for grate area, firing clearance, gas mixing, flameway or combustion chamber space, and air supply.

RUSSIAN (WHITE SEA) RAILWAY CONNECTION.—It has been decided by the Russian government to commence the construction of a railway between Petrozavodsk and Kem. It is proposed to extend the line to the port of Alexandrovsk to connect the White Sea with the main Russian railway system. The line is to be completed in a year, and to be entrusted to the Olonetz Railway Company, which will build a railway connecting Petrosavodsk with Zvanka on the Northern Russian Railway system.

THE SIMPLE TRAIN STAFF*

The reader interested in train-operation will have noticed in our issue of December 18, 1914, an account of what may be called a simplified block system, in use on the Ligonier Valley and of the use of the electric train staff, on a busy suburban section of the Long Island, without station attendants. While both of these installations lack certain elements which are essential in a complete block system, they are decidedly interesting as examples of ready adaptation of facilities to conditions surrounded by undesired limitations. In neither of these cases can we speak of block *signals*, as in neither of them do we find fixed visual signals, using that term in its ordinary sense. Semaphores and green and red lights they can get along without, indefinitely.

But in commending simplified railroading in these two instances we have told an incomplete story. An officer of the New York, New Haven & Hartford, to whom the article was shown, reminds us that on that road they have used the staff system, pure and simple; no electric wires, no semaphores, no disks, no telegraph and no telephone. This use was temporary, on the occasion of heavy holiday traffic; but it deserves to be recorded (if for no other reason) because this simple and efficient preventive of butting collisions seems not to be properly appreciated in this country. An electric road in North Carolina and a short freight track of the Lackawanna road are the only places that we can recall where it is used regularly. It was used



for some time about 1890 on a short section of the New Haven road.

The simple train staff was used in England a half century ago. In regular use the system provides for sending two or more trains, following one another, on the authority of the one and only staff, by means of "staff tickets," kept in a cavity in the staff and given out, to preceding trains, by the engineman of the last train, who carries the staff and the unused tickets. With this arrangement the system affords, of course, no protection against rear collisions. In the use of the simple staff today there is available one important advantage which was unknown when the system was in most extensive use in England, namely, the telephone. In case a train finds that the staff is at the wrong end of the staff-section measures can be taken to get the right to the road by wire. In the old days a man was sent on horse back, or on foot; or possibly a hand car could be used.

On the New Haven a speeder was provided, so as to make the

*For the benefit of non-railroaders it may be said that the train staff system is a method of regulating the movements of trains, on a single track line, which takes its name from the fact that originally a stick of wood, 22 in. long, was the staff. An engineman, running a train over a section of road, say from A to B, derives his right to use the track over that section not by a timetable, or a signal, as in ordinary practice, but by the possession of the staff. This is given to him by the station attendant at the entrance of a section, and at the outgoing end of the section he delivers it to the attendant at that station. It may then be used for a train running in the opposite direction.

service independent of the telephone and telegraph. It was used once in the course of three heavy days, on the occasion of the failure of an engine.

The use now recalled was in connection with summer excursion traffic on the line between Providence, R. I., and Fall River. The plan of this part of the railroad is roughly indicated by the sketch. The sections on which the staff was used were those between Warren and Kickimuit; between Touisset and Lee's River, and between Brayton and Fall River. On the first of these sections the staff was colored red; on the next one yellow and on the last one blue. On the days in question the number of passenger trains during the hours between 7 a. m. and 9 p. m. was about 116; and during the busiest period as many as ten trains an hour were run. The speed limit for all trains over the switches at Kickimuit and Lee's River was 15 miles an hour; and, aside from this reduction in speed, there were practically no delays due to the use of the staff. With so many extra trains there were, of course, some cases of waiting at one end or the other of a single track section; but this was not due to the method of operation.

WESTERN ASSOCIATION OF SHORT LINE RAILROADS

Officers of a dozen short line railroads of the states of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming met in San Francisco in November last and organized the Western Association of Short Line Railroads. Their main purpose is to secure more equitable compensation for carrying the mails, but the association will take up other matters of common interest. A letter, signed by the president and secretary, has been sent to every member of congress setting forth the bad features of the present laws regulating mail carriage and of the proposed changes now before Congress. This letter says in part:

"House bill 17042 changes the basis of mail transportation rates from a weight to practically a space basis and invests the Postmaster General with autocratic power in regulating the compensation, character of service and form of equipment, even to compelling the use of steel cars for mail carrying, and gives him the power to impose a fine of $5,000 per day for refusal of a railroad to carry the mail at the rates of compensation and in the manner specified by him. . . . The short line railroads operating in the states of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming most earnestly protest against the enactment of either H. R. 17042 or S. 6405 as being grossly unfair to such railroads. Their mail revenue, which at present is entirely inadequate for the service rendered, will be arbitrarily reduced. . . .

"The rates of compensation provided for are based on averages obtained all over the country. . . . The short line railroads west of the Rocky Mountains, due to the sparsely settled condition of the country, the heavy mountain grades and long hauls between stations, are operating under conditions far more expensive than those existing in other parts of the United States. The majority of these railroads operate but one mixed train per day each way, so that it should be apparent that no such average can be fairly applied. . . . An exclusive space basis would give the employees of the postoffice department absolute control over the amount of compensation to be paid railroads, according to their opinions or inclinations, and might be used for personal advantage or political gain.

"The Bourne bill further provides that the Postmaster General shall not have authority to authorize payment for more than seven lineal feet of space, for closed pouch service, in any one train. It is immaterial how much space the postal matter delivered to the railroad for transportation will occupy, be it 10, 15 or 20 ft.; only 7 ft. will be paid for, and when the railroad operates but one train a day, it has no opportunity to equalize this burden.

"Radiating from the termini and from points on the line of most of the short line railroads of the states mentioned, numerous Star Routes carry the mail by wagon or motor to the small towns and ranches not reached by the railroad. These Star Routes are a continuation of the railroads in so far as the mail is concerned, and the retail merchants of the communities off the railroad are profiting by this fact because the parcel post rates, including wagon haul, are less in many instances than even the freight rates on the railroads; consequently the wagon haul from the railroad to destination is accomplished at no cost to the shipper. In this manner immense shipments of foodstuffs and other matter, in the aggregate running into tons and carloads in each consignment, and consisting of flour, bran, canned goods, cement, coal, pressed brick, etc., are sent by parcel post, the government paying out for the team haul alone in many instances more than the total sum received by it for the entire haul by rail and team, and the railroad receives little or nothing for a tonnage that legitimately belongs to it and for the transportation of which, as freight or express, it was formerly paid.

"Since the last quadrennial weighing of the mail in the West, the packers have reduced the standard weight of merchandise packages to about 48 pounds. Mail contractors, builders and merchants have been quick to take advantage of this, which has not benefited the consumer, and as a consequence the railroads are hauling a tonnage of postal matter for which they receive no pay whatever.

"It is a matter of common knowledge that most of the short line railroads in the western states are struggling for a mere existence and if the carrying of the United States mail is to become a heavy burden, it will mean that freight and passenger rates will have to be advanced. . . .

"The short line railroads in the states named urge that the present law regulating railroad mail pay be amended so as to provide for annual instead of quadrennial mail weighing, pay for apartments in cars used as traveling post offices, and relief from carrying the mail between railroad stations and post offices.

"In the event that Congress shall not deem it advisable to amend the present law as suggested, we then urge that the entire matter of fixing rates for carrying mail be placed in the hands of the Interstate Commerce Commission with full power to act."

The president of the association is D. M. Swobe, traffic manager of the McCloud River, and the secretary is C. M. Oddie, general counsel of the Nevada Central, and the office is in the Mills building, San Francisco, Cal.

AMERICAN COMPANIES TO SUPPLY TIES AND FUEL FOR THE EGYPTIAN STATE RAILWAYS.—The Cairo correspondent of an English contemporary, states that the efforts being made by American manufacturers and producers to procure Egyptian railway and engineering orders are remarkable. Only a short while ago a British steamer sailed from California loaded with ties for Port Sudan; and this is stated to be the first business of this kind which has ever been done between the American Pacific coast and the Red Sea ports. Considerable assistance is being given to tie representatives by the fact that most of the ties hitherto used by Egyptian railways have been of Turkish oak or Karamanian wood or of Baltic creosoted pine, none of which are now obtainable. The contract for the supply of coal for use on the Egyptian state railways during the next 12 months has now been let. Of the total quantity required—190,000 tons—a London company has received an order for 120,000 tons and the balance—70,000 tons—or over one-third of the supply, has been placed with American companies as follows: 60,000 tons from the Fairmont region of West Virginia, 5,000 tons of New River coal and 5,000 tons of Greek Island coal.

What the Stoker Has Done for the Locomotive

Data as to Increase in Capacity and Effect on Coal Consumption; Stoker Should Do 100 Per Cent of Firing

In the issue of December 11, 1914, page 1079, we published part of the discussion of the report on "Steam Locomotives of Today" at the annual meeting of the American Society of Mechanical Engineers, held in New York, December 2. In taking up that part of the committee report dealing with mechanical stokers for locomotives some interesting data were presented by C. F. Street, vice-president of the Locomotive Stoker Company, New York, and E. A. Averill, engineer of operation of the Standard Stoker Company, New York.

DISCUSSION BY C. F. STREET

The most important accomplishments of the mechanical stoker as applied to locomotives, are the increasing of the earning power of existing locomotives, and the removal of all limitations, from a fuel quantity standpoint, on the size of locomotives.

The locomotive designer should always keep in mind the fact that every dollar earned in the operation of a railway must be earned by its locomotives, and, therefore, I have, in the above, given first place to the increase in the earning power of existing locomotives. I could cite many instances to prove this statement, but as an illustration, will take one:

A locomotive having about 54,000 lb. tractive effort when running with saturated steam, had a tonnage rating over a certain division of 4,750 tons. Superheaters were applied to this locomotive, and the tonnage increased to 5,000; stokers were applied, and the tonnage increased to 5,250; then 5,500; then 5,750, and finally 6,000 tons. In the meantime, the tonnage rating of the shovel-fired, superheated steam locomotives was increased to 5,500 tons. This shows an increase of over 20 per cent in the tonnage rating of this locomotive after the stokers were applied, and the locomotive today, stoker-fired, is hauling 10 per cent more tonnage than when shovel-fired.

The increase in the tonnage rating of the shovel-fired locomotives is very interesting, and brings out strongly one of the indirect advantages of the stoker. It shows very clearly that before stokers were applied, the shovel-fired locomotives were not doing anywhere near what they should do, and as soon as the stoker came into use, it increased the earning power, not only of locomotives to which it was applied, but to all others on the division.

The stoker is making it possible to come much nearer to theoretical conditions in regular operation. We all know that there is a wide difference between the earning power of a locomotive under test conditions and under average road conditions. I have in mind one case, in which, under test conditions, it was found that a certain locomotive could haul 4,000 tons comfortably over a certain division. When this locomotive was put in regular service, however, it was found impossible to operate it with more than 3,500 tons over this same division. With the stoker, these locomotives can easily haul 4,000 tons in regular road service.

The fact that the stoker has removed limitations in the size of locomotives can be brought out by reference to several of the locomotives referred to in the committee's report.* The Mountain type locomotives referred to were fitted with stokers when they were built, have always been stoker-fired, and no attempt has ever been made to shovel-fire them. One of the locomotives referred to would never have been built had it not been known that a stoker could be secured which would fire it. There are 30 of the locomotives of one class referred to now in regular operation, and they would never have been built had it not been known that a stoker could be secured which would fire them. A number of other locomotives, notably the most powerful Pacific type as yet built, are now in regular operation, and would never have been contemplated without a stoker.

In another paragraph, the report says "It is now possible to fire six tons and more of coal per hour in a locomotive firebox." As high as eight tons has been put in a firebox with an existing machine, and without working it to its capacity. There is no reason why any desired quantity of coal cannot be fired by the use of a stoker, and this limitation is entirely removed in connection with the designing of new locomotives.

The stoker, as yet, has not progressed far enough to bring forth definite figures regarding its efficiency. Wherever it has been introduced, the question of increased tonnage has been more important than that of fuel economy, and the latter has therefore been given very little consideration. This, of course, is only a temporary condition, and as more stokers are applied, the question of fuel economy will become more and more important. We have, however, gone far enough with the stoker to definitely determine two points, which have a bearing on this feature:

First, the stoker will burn a much cheaper grade of coal than it is possible to use with hand firing.

Second, it will give a more uniform rate of fuel consumption on locomotives performing the same service.

It is well known that there is a difference of from 25 to 50 per cent in the amount of coal burned by different firemen for performing the same work. The stoker is eliminating this great variation, and making the results more uniform. The stoker is to the locomotive what the automatic feed is to a machine tool. It means increased capacity, more uniform output, and in addition the elimination of inaccuracies and wide variations in results.

There are today, very few, if any, shovel-fired locomotives in this country having a maximum tractive effort of 50,000 lb. or over, which are being worked to their full capacity. Wherever stokers have been applied, the earning power of the locomotives on which they have been placed has been increased from 10 to 20 per cent. There is no instance where stoker-fired and shovel-fired locomotives are being operated under identical conditions. The stoker-fired locomotives are, in every case, hauling increased tonnage, or using a cheaper fuel, or working at higher average speeds than the shovel-fired locomotives, and are, therefore, earning more money for the railroads on which they operate.

DISCUSSION BY E. A. AVERILL

Although the proper firing of a locomotive by hand has reached the stage of a skilled operation and some remarkable records have been made in certain instances, the progress of locomotive development has now almost entirely passed the point where skilled manual firing can properly do the work if the full capacity of the locomotive is to be used.

At a speed in miles an hour equal to about one-half (.476 to .636) the diameter of the drivers in inches, the capacity of most modern freight locomotives is fixed by the boiler capacity. In a report of a test on a large locomotive at the Altoona test plant of the Pennsylvania Railroad, it is stated that the results indicate that the capacity of the boiler was limited by the ability to burn the coal on the grates and not by any failure of the heating surface to absorb the heat supplied. While in this case the limit was marked by the impossibility of supplying sufficient air through the grates to properly burn the fuel, there are a reasonably large number of locomotives operating in this country today which are running at less than full boiler capacity because of the physical inability of the fireman to supply the amount of fuel that can be burned. These locomotives are giving to the drawbar the pull the man can supply but not what

Railway Age Gazette, November 20, 1914, page 947.

the locomotive is capable of supplying at the desired speed.

I have selected at random ten classes of locomotives built during the past three years which are typical of the general size and capacity of all the larger freight engines built in that time. These are shown in the accompanying table. The American Locomotive Company's standard practice in connection with steam per horsepower hour and evaporation per pound of coal has been used; also the percentage of tractive effort and maximum horsepower at various piston speeds and the evaporation per square foot of heating surface for the firebox and tubes. It is assumed that each locomotive is working at the speed indicated on a .5 per cent grade, and that the cars in the train each weighs with lading 70 tons.

When delivering the power each of these locomotives is easily capable of giving, if in good condition, it will be seen that they require from 4,900 lb. to over 8,000 lb. of good quality coal an hour. Similar calculations for grades of less rise will show a higher speed and greater coal requirements per hour.

It is evident that these engines, with the possible exception of the last one, are not being supplied with this amount of coal, although they could use it if they were. They are actually getting from 4,500 to 5,000 lb. an hour and handling trains of a proportional size. The last one on the list is included to show the size that lies near the dividing line between hand and stoker-firing. These ten examples are typical of the ones referred to as giving the drawbar pull the man can supply, but not what the locomotive is capable of supplying.

A number of locomotives like these, all of the same class and operating on the same division, will have a tonnage rating in proportion to the ability of the average poorest fireman that is assigned to them rather than of the average best fireman. While there may be a few firemen on the division who are capable of developing the full boiler capacity, the group of engines as a whole may be daily working much below their actual capacity. The acceptance of the opportunity to supply the desired quantity of coal at all times to these locomotives, that is offered by the stoker, will have the same practical effect on operating expense as would a new order of more efficient, larger locomotives. A reduction in the cost of conducting transportation follows this increased locomotive capacity in a number of the principal items when presented on a ton-mile basis. The stoker itself offers an opportunity for further saving, particularly in the cost of fuel, reduced claims for damage or accident, and the recruiting of men of higher caliber for locomotive service.

An instance of the possible savings in the cost of conducting transportation through increased locomotive capacity following the application of a stoker, is found on a certain division where ten tonnage trains are sent one way over the road each day with hand-fired locomotives. Application of stokers has permitted an increase of over 11 per cent in the tonnage of a train. The return movement is largely empties. The application of stokers will give a direct saving in wages and train supplies alone of about $100 per engine a month on this division. If advantage is taken of the increased capacity of the division for tonnage without the addition of more locomotives, the saving will be considerably larger.

Naturally one of the first features to be investigated by a railroad considering the application of stokers, is the cost of maintenance. In general, the machine of any kind with the fewest parts, if they are properly designed, will cost the least for maintenance, inspection or repairs. This rule holds good for stokers. During the past year and a half there has been a distinct advance made in connection with the simplification of the stoker apparatus. The latest type of locomotive stoker consists of a comparatively few strong, heavy parts and a few wearing surfaces. This is progress in the right direction, not only for the cost of repairs when overhauling but for reliability of operation in regular service and ease of thorough inspection.

There has been much discussion of the amount of coal consumed on stoker fired locomotives. In some cases they do burn more coal per trip and the mistake of making the comparison on pounds of coal consumed per 1,000 ton-miles, has led to the deception of some investigators. Accurate tests permitting the comparison of shovel and stoker-firing to be made on the basis of pounds of coal per indicated horsepower, or pounds of equivalent evaporation per pound of coal, however, have shown widely varying results with different designs of stokers. Some carefully conducted evaporative tests with the most recent design of stoker are very encouraging in this particular. These tests were made with the locomotive in regular service. Comparing the average of five hand-fired runs and four stoker-fired runs on the basis of actual pounds of water evaporated per million B. t. u. supplied, the stoker gave an increase of nearly 7½ per cent. No data from which the horsepower or the drawbar pull could be accurately determined was taken, and hence no comparison can be made on those bases.

These tests showed an actual economy of coal and were well checked by later individual runs where the evaporation per 1,000,000 B. t. u. supplied was considerably larger than that just mentioned. In one case the increase in evaporation with the stoker was nearly 12 per cent. From these figures, as well as observations in regular daily service, it would appear that some saving in coal can be expected from this stoker. These tests were made with run-of-mine coal.

A stoker should successfully handle the coal in any condition it may be put on the tender. It should make no difference if it be all dust or clean lumps of larger size, soaking wet, slightly damp, or bone dry. It should take the coal as it finds it the same as a fireman does. The development of stokers in this direction during the past year or two has been particularly satisfactory and ordinary run-of-mine coal is now being used with complete success. The use of lower and cheaper grades of coal is quite general on the stoker locomotives of a number of roads, which report a net saving from the practice.

Calculations that have been made of the movement of the gases in a firebox equipped with a brick arch, show that velocities of over 180 miles an hour, or 265 ft. a second, will occur over the end of the arch when burning 6,000 lb. of coal an hour on 70 sq. ft. grate area. The velocity decreases as the fire bed is approached and at a point 2 ft. above the grate the gases have an average velocity of about 33 ft. a second, or 22.5 miles an hour. This clearly indicates the importance of injecting the fuel charge as low down in the firebox as possible to reduce the loss by partially burned fine coal passing through the tubes.

Type	Cylinders, In.	Steam Pres., Lb.	Diam. Driv., In.	Max. Tractive Effort, Lb.	Max. Cyl., Hp.*	Normal Hp. from Heating Surface†	Coal per Hr. at Max. Hp.‡ Lb.	Speed for Max. Hp. Mi.	On grade of .05 per cent: Speed m.p.h.	Tons in Train	Hp. Req'd	Coal per hr., Lb.	Coal per sq. ft., G. A., Lb.	Water per sq. ft., H. S., Lb.
2-8-2	25 x 32	180	63	48,600	2,027	2,210	6,587	35	25	1,930	1,945	6,320	112	9.88
2-8-2	28 x 32	170	63	57,460	2,400	2,310	7,507	35	25	2,382	2,290	7,440	106	11.5
2-8-2	27 x 30	175	63	51,700	2,296	2,269	7,374	37.5	25	2,183	2,160	7,020	100	11.05
0-8-8-0	26 & 41 x 28	200	51	105,000	.....	3,032	8,759§	32.5	15	6,050	2,860	8,240§	82.4	10.6
4-8-2	28 x 28	185	69	50,000	2,613	2,451	7,965	44	35	1,403**	2,390	7,767	124	12
2-6-6-2	21½ & 34 x 32	200	57	67,500	2,533	2,312	7,514	32	15	3,820	1,940	6,300	111	9.2
2-8-2	28 x 32	180	64	60,000	2,542	2,418	7,858.5	36	25	2,470	2,410	7,840	100	10.8
2-8-0	26 x 30	185	57	55,900	2,251	2,167	7,242	34	15	3,210	1,765	5,750	86	10.4
2-8-8-2	26 & 40 x 30	200	57	87,600	.....	2,942	9,561	34	15	5,060	2,390	7,800	92	9.2
2-8-0	25 x 30	180	57	50,328	2,027	1,848	6,006	34	15	2,920	1,510	4,900	87	11

*Horsepower + .01798 Pd² at 1,000 ft. piston speed. †Normal horsepower from heating surface = evaporation, lb. per hour ÷ 20.8 lb.
‡ 3.25 lb. coal per horsepower hour. § 7.2 lb. water per lb. of coal. ** Passenger train.

The opportunities for economy in connection with the reduction in damage claims follow the better lookout from the locomotive by the fireman because of being left free to watch signals, crossings and the operation of the machinery on the left side.

One of the essentials in this connection is noiseless operation. The stoker should not prevent free conversation across the cab nor make any noise that can be heard when the locomotive is running. The development of the past year or two has shown a wonderful improvement in this particular and stokers are now being applied which are essentially noiseless in their operation.

The stoker should be 100 per cent efficient; it should do all the firing, handle all the coal from the tender with the minimum attention and not require alteration of the distributing means after it is once properly adjusted. The fireman should be free to attend to the duties mentioned above and should be able to control the stoker operation from a position on the seat box.

It is well established in manual firing that small quantities of coal fed frequently and distributed by the "cross fire" method give the most perfect combustion. The stoker should follow this method but perform the operation more exactly than it can be done by hand. Recent development shows a full appreciation of this requirement, and at the same time provides a flexibility that allows the stoker to exactly meet the conditions of combustion at the various parts of the grate. If 70 per cent of the coal is being burned on one side of the grate, the stoker should discharge that proportion of the fresh fuel on that section. If more fuel is being burned in front than at the back, the stoker should distribute to suit. This flexibility is essential for 100 per cent stoker work.

There is another feature of improvement in the most recent of the scatter type stokers that has been particularly appreciated by designers and by enginemen. I refer to the absence of any part of the stoker on the boiler head or in the cab. There are stokers now being applied which show practically nothing in the cab and thus allow the best arrangement of the many instruments and appliances required on a modern locomotive. This, especially in connection with the reduction of noise, is one of the most important developments of the recent past, as it is in the direction of greater safety of operation and reduced strain on the mental and physical energy of the engineer. The absence of apparatus at this point also permits the proper inspection of all the staybolts and their renewal if necessary without the removal of any part of the stoker.

BEAM-LIGHT SIGNALS ON THE PENNSYLVANIA

The Pennsylvania Railroad, in connection with the introduction of electric traction on its main line from Philadelphia westward will introduce, in place of semaphore block signals, a novel arrangement of lights, uncolored, by which both motion and color will be done away with, the lamps being used day and night. Mr. Rudd, the signal engineer, has given us the following description of the new signals:

"We have developed what we call, for lack of a better name, the 'beam-light' signal, and are to install it between Overbrook and Paoli, about 16 miles of four-track road with five interlockings. The signals will give three-block indications, and will be located approximately 3,500 ft. apart. If the scheme proves satisfactory it will be useful especially where A. C. track circuits are installed, as with it the only moving part in the system is the control relay, which is necessary with any system. As designed each unit is generally arranged as shown in Fig. 1. Four fixed lights in a row, one light being common to all three rows. The containers for the lamps, lenses, etc., are clamped to steel tubes diverging from a center casting, a suitable background being attached to the center support but back of and separate from the tubes supporting the lamps.

"The lamps are spaced 18 inches apart, center to center, and are 12-volt, 4-candlepower, 5-watt Mazda; concentrated filament with adjustable base, burning at 11-volts in bright daylight or in fog, 6-volts at twilight and 3-volts at night. The current consumption will average up about ten watts for the four lights. Special inverted 5⅜ in. lenses and very light yellow cover glasses are placed in front of the lamps; and a reflecting mirror above the cover glass to throw some of the rays down for close range. There will be a hood over each unit. These lights are readily seen in brightest sunlight at 4,000 ft. or more. Scareheads of newspapers can be read by them at night 1,000 ft. away if the full day voltage is used; hence the necessity of dampening down at night.

"The voltage will be controlled from the nearest signal cabin by the signalman. The entire arrangement is immovable, the rows of lamps being lighted as conditions require. Two units will be used on all signals—equivalent to two semaphore arms—thus making a uniform system, the aspects corresponding to the position of the arms as in standard practice, but at interlocking signals the bottom (low-speed) arm will not be displayed in the stop position at all. When it is required two short-range lights will be shown, diagonal or vertical, in addition to the two upper arms horizontal. This is a decided advantage, as the engineman will know that unless two full size beams appear, the signal is improperly displayed. No permissive aspect

will be required, but if needed it can be shown by a row of lights diagonal (45 deg.) in *lower* right-hand quadrant.

"The staggered light effect to distinguish stop and proceed signals from stop and stay will be produced by having the bottom horizontal beam moved to the left one light, as shown in Fig. 2, the difference being required only in the stop indication.

"For dwarf signals, which cannot be hooded lest close range reading should be obscured, frosted white cover glasses and higher candlepower lamps will be used.

"This arrangement will eliminate all failures due to moving parts of signals and mechanisms (except the relays), and all chances of freezing or sticking clear. From our records it appears that this should reduce all failures, with their consequent delays, at least 10 per cent, and all dangerous failures 40 per cent. The scheme solves the colored-light problem for night indications completely, by eliminating all colors and establishing signaling by position only.

"With current supplied from a power line generation of current is cheaper, as there is no 'peak of the load' to be provided for as in motor signal work. This reduces the cost of operation. The initial cost of installation is less; the cost of maintenance, aside from necessary policing should be less and the cost of delays will undoubtedly be reduced. The risk to employees is reduced as all their work will be on the ground, except occasional inspection of wires, adjustment of lights, renewal of lamps and cleaning the lenses."

ELECTRIFICATION OF A PORTUGUESE RAILWAY LINE.—A decree has been signed by the president of the Portuguese Republic for the electrification and lease of the railway connecting Lisbon with Cascais. The line is about 16 miles long and is owned by the Portuguese Railway Company. It is double-tracked, of broad gage, and rock ballasted. There are practically no grades. The line serves the so-called Riviera of Portugal and should be a paying investment. In the summer season 40 trains each way are operated, and in winter 26. Expresses make the entire distance in from 35 to 40 minutes, with 3 stops; the locals, stopping 19 times, take 1 hour and 8 minutes. It is proposed to operate electric trains every half hour and to make the entire run in 25 minutes.

Instructions for the Federal Valuation Parties

An Abstract of the Regulations Governing the Field Engineers, Showing the Data They Are to Secure

The Interstate Commerce Commission, Division of Valuation, has issued a second tentative draft of instructions for the guidance of roadway and track parties in the conduct of their field work. The following is an abstract of those portions of these instructions of interest to railway men:

Each roadway party will be provided with right-of-way and track maps, station maps and profiles of the property to be inventoried. They will also be provided with such ballast, rail and fence charts, and culvert, bridge and building lists, and other records of property which the carrier may be able to supply, and which will assist in identifying the property.

Wherever it can be so arranged the carrier will place with each roadway party a representative who is familiar with the property. He will be permitted to observe in detail the methods used, and the records of fact made by the roadway party, provided a co-operative agreement with regard to said notes has been executed.

Field Corps.—A field corps shall consist of three or more roadway parties directed by a field engineer. The field party of the roadway and track departments shall generally consist of three groups: A chaining group, a cross-section group, and one computing group. The chaining group shall generally consist of a recorder in charge, a head chainman, and a rear chainman. In general it shall be the duty of this party to chain the track and locate by station and plus all structures and property, and to inventory ties, rail, track material and fastenings, culverts, small bridges, fences, signs, crossings, small buildings, pavings, etc. The cross-section group shall generally consist of an instrumentman in charge, a rodman and a tapeman. In general it shall be the duty of this group to measure the grading, ballast, tunnels and subways. There shall generally be two computers with each party.

Condition of Property.—The assistant field engineer shall make notes on the condition of all property which it is his duty to inventory. The notes shall generally be made in accordance with the following outline:

(*a*) *Age.*—Ascertain, where practicable, the year of construction, installation or purchase of the property, and whether at that date the property was new or second-hand. If used prior to its present service, give such facts as may be obtained as to length and nature of service elsewhere. State source of data.

(*b*) *Wear and Decay.*—Record such facts as to wear and decay as may be practicable from field observations.

(*c*) *Maintenance.*—Record whether maintenance is normal. If the maintenance is above or below normal, give facts on which the conclusion is based. Where extensive or unusual repairs are needed to put the property in serviceable condition, note such facts in detail.

(*d*) *Probable Service Life.*—Record any local conditions which many operate to shorten or lengthen the service life of the property as compared with average service life of similar property elsewhere. Record any evidence which may be ascertained in the field as to the inadequacy or obsolescence of the property. Where any definite field evidence can be ascertained as to the probable remaining service life of units of property, note shall be made of same.

Abandoned Property.—Abandoned property, in so far as the work of the roadway party is concerned, may be considered as fixed physical property which has been acquired or created by the carrier and used for transportation purposes, and which subsequently the carrier has permanently ceased to use or hold for any of its purposes as a carrier. The commission has directed carriers to file detail schedules and claims of property abandoned. Where such claims and schedules are furnished by the carrier, and records supplied which will enable the roadway party to identify the property in whole or in part, it shall make such a general check of the claims and identify the property to the extent practicable in the field. Where carriers file no claims on account of abandoned property, the roadway party shall not attempt to locate or ascertain the quantity of such property, unless specifically instructed to do so. All notes of abandoned property shall be kept entirely separate from those of property in use.

Base Line.—Unless otherwise instructed the base line will be as follows:

1. On single-track roads, including side tracks, midway between the rails of the main track.
2. On double-track roads, midway between the two main tracks.
3. Where the carrier has a base line already defined on the ground it may be used. Structures shall all be located by their station and plus on the base line.

The base line shall be accurately chained with a steel tape.

Cross-Section Instruments.—The instruments to be used in cross-section work will depend on the character of the grading. Where the cuts and fills are less than 8 ft. in height, hand level, rod and tape shall generally be used. For cuts and fills of greater height a hand level, Wye level or other instrument may be used.

Land for Transportation Purposes.—The external boundaries of the right of way, as shown on the right of way and track maps, shall be verified on the ground by measurements to fences, monuments or other evidences of right of way limits, and if no such evidences exist the fact shall be recorded in the notes. When the maps show the right of way to be of uniform width, it will be sufficient to measure and record the width at each tenth station. Where a change of width or other irregularity occurs, note and give station of same. For irregular parcels make sketches where necessary to show boundaries and dimensions measured.

Grading.—The grading inventory shall include all work classified under this account, and in addition thereto, separately recorded, grading work done for buildings and structures where, in the judgment of the assistant field engineer, such work can best be measured by the cross-section group. Cross-section measurements shall be made of the roadbed as it now exists in such manner as will permit an accurate ascertainment of the quantities therein. In general, cross sections shall be made at each 100-ft. station and at such intermediate points as the conditions demand for calculating the grading quantities and their classification. The station and plus of all grade points shall be noted.

Following the specific instructions of the assistant field engineer, the instrumentman will make notes as to classification of excavated materials, recording when possible the lines of demarcation between the different classes of materials in excavations in order that such lines may be platted.

Unless otherwise instructed, all material excavated shall be classified by the assistant field engineer as "solid rock," "loose rock" or "common excavation." Where the lines of demarcation in excavations are not plain, the use of the pick and shovel shall be resorted to and every effort made to secure cross-section notes which will permit the calculation of quantities of classified material. Where evidence on the ground indicates that the determination at the present time of quantities which have entered into the grading could not be done with the proper degree of precision, the carrier's cross-section notes of original construction, where these exist, shall be utilized to assist in establishing the original ground surface, and where so used the notes shall clearly indicate it.

Notes shall be made where evidence exists of the acres of clearing and grubbing required for the original construction of the roadway. Notes shall be made of the character and quantity of materials entering into retaining walls, riprap, cribbing, artificial sodding, dams, mattresses, bulkheads and similar construction used for supporting or protecting the roadbed. Sketches shall be made where necessary, giving sufficient dimensions and description to enable the computation of materials.

TUNNELS AND SUBWAYS.—Tunnels shall be measured between portal faces and the station and plus of each face recorded. Sketches shall be made of cross-sections, giving dimensions. Note all changes in cross-sections and the length of the varying sections. Portals shall be measured and sketched with sufficient detail to permit a calculation of quantities. The character and thickness, where practicable, of lining walls, invert, etc., shall be noted; also note character of ventilation, drainage, amount and character of back filling, and other similar information pertaining to the actual construction of tunnels as fully as can be obtained in the field. A description, supplemented with sketches in the absence of plans, shall be made of shafts, drains, ducts, etc., sufficient to permit the quantities and materials of construction to be calculated and full notes made of the special conditions affecting the cost under which the tunnel was built. If the present section is an enlargement of the original section, this fact should be stated with such notes regarding the original section as can be ascertained from records or from railroad employees and others familiar therewith. As far as practicable classify and ascertain the quantities of materials encountered in excavating the tunnels.

BRIDGES, TRESTLES AND CULVERTS.—The roadway party shall locate by station and plus all bridges, trestles and culverts, but shall inventory in detail only those structures which are less than 12 ft. in span, unless otherwise instructed. Bridges of 12 ft. span and over shall generally be inventoried by the bridge department.

TIES.—The kind of ties, whether treated or untreated, and whether oak, pine, cedar, fir, etc., together with the dimensions, class and average number per mile, shall be noted. The ties in main lines and sidings shall be listed separately and note made of the kind and class of ties in each track. Note shall be made whether ties were obtained locally or shipped in, and from where.

In order to estimate the number of ties per mile the ties shall be counted in not less than 600-ft. sections, two sections per mile. The station and plus of sections counted and details of the tie count shall be noted. Note length of track occupied by each set of switch ties or crossing timbers. Observations for noting condition data of track ties in main line shall generally be made on these 600-ft. sections.

Switch ties shall generally be inventoried by sets. Where the carrier has standard turnouts note shall be made of the number of switch sets of each type or standard of turnout. The kind of timber, and if treated or untreated, shall be noted in each case. Where there are material variations from the standard turnouts the exact number of switch ties shall be counted. Note shall be made of all special switch and crossing timber in sufficient detail to permit of estimating cost.

RAILS.—Note the weight of all rail and give the station and plus wherever the weight changes in either main or side track. The lengths of individual rails shall be measured only at sufficient intervals to determine the standard rail lengths in use. Note if rail is Bessemer, or open hearth, or special steel. Where a carrier has no standard drawings showing sections of rail make dimensioned sketches where necessary of sections of different weights of rail. Where obtainable the brand of rail shall be noted from time to time as information as to age, weight and source. Particular attention shall be paid to rails in both main and side tracks to secure information as to where the rail was obtained, and whether when laid, it was new or re-lay.

OTHER TRACK MATERIAL.—In general, rail joints, bolts, spikes, nut locks, tie-plates, etc., in main line shall be obtained and noted by determining the various track materials in the same 600-ft. sections as the ties, and from the data thus obtained estimate such material in the mile. For rail joints, show kind, weight, maker's brand and number, number and kind of bolts required, and number and kind of nut locks used, if any. If carrier has no plan showing types of rail joints in use make sketches where necessary of the different types.

For spikes, note size, average number used per tie, and total per mile. For tie-plates, note kind, dimensions and weight. It is not necessary for the field party to count the number of each kind of tie-plates in a mile, but only to obtain and note as above for a mile of main line or a siding, with the notation that they are mixed kinds. If practicable an estimate may be made of the percentage of each kind. For rail braces make notes in same maner as for tie-plates.

For other track material not specifically mentioned, use such methods to ascertain the inventory as will give substantially accurate results without a detail count of each small item. Other track material in sidetracks shall be listed separately for each track.

Switch points shall be inventoried complete by standard points of different kinds and weights unless there are missing parts which materially affect the cost of the switch. Missing parts shall be taken into consideration in noting on "condition." Frogs shall be classified by kind, i. e., rigid, spring, movable point, etc.; number and weight of rail. Also note when special alloy steel is used. For switch stands, obtain and show kind, i. e., high ladder, high, low or ground throw; kind of lamp used, if any; name of manufacturer and index number.

For materials of this account in sidetracks, but not specifically mentioned, ascertain the amount and kind in a way consistent with the importance of the items involved. Note extra spiking on curves and switches, or elsewhere. Special fixtures which can not be described by number or otherwise, so that they may be identified by catalogue or plans of carrier, shall be measured and a dimension sketch made, where necessary. Note station and plus of all main-line switch points; also give switch leads, length of crossovers, length of slip switches, etc. Length of sidetracks shall be determined from point of switch to point of switch or to end of track.

BALLAST.—Notes for ascertaining ballast shall be made as follows: Excavation sufficient to determine the cross-section of ballast shall be made at intervals of not greater than 1,000 ft. where the ballast is of one kind and the section apparently uniform, and a dimensioned sketch of said section shall be recorded. Such sketches shall also be made at points where the kind of ballast changes or where there are material variations in the ballast sections. The station and plus of sections taken shall be noted.

Notes shall show the kind of ballast, and where two or more materials are encountered in a cross-section the dimension sketch shall clearly show the extent of each kind; the quality of the ballast; the location from which ballast was secured, and if off the line of the carrier, the length of haul to the nearest point on the line of the carrier under inventory; and also information as to conditions of handling and loading, where these facts can be obtained in the field.

Where ballast is of a depth in excess of the standard section of the carrier; or, in the absence of such a standard, greater than 18 in. below base of rail, a separation of the excess ballast material shall be made in the computation of quantities. Ballast quantities shall be summaried by miles, and notes shall show what deduction was made for displacement of ties. The quantities of ballast in main and side tracks shall be shown separately.

TRACK LAYING AND SURFACING.—This is a labor item and can not, therefore, be inventoried, but the assistant field engineer shall note any unusual conditions, if any, which would affect the cost of doing the work.

RIGHT OF WAY FENCES.—This item shall include right of way fences, cattle guards, wing fences, aprons and hedges. Other fences around station buildings, shop grounds, stockyards, etc., shall also be inventoried, but shall be classified with the par-

ticular building or structure to which they apply. Record shall be made of the length and location of each kind of fence, giving the average number, kind and spacing of posts per unit, number and kind of wires, size of plank where used, character of bracing, etc. The number and type of all gates shall be noted. Fence charts will be furnished where these exist, and their accuracy checked and reported. In the absence of these, sketches shall be made by the recorder, using conventional signs, if desired, for different kind of fencing. The length of fencing, including wing fences, must be shown in the record.

The location and kind of all cattle guards shall be noted, whether surface or pit, and if surface the kind of material and name of the guard or type of construction shall be indicated.

LOCAL FREIGHT BY PARCEL POST

The photograph illustrates in a striking manner the extent to which the railways are being called on to carry local freight on passenger trains under the guise of United States mail The boxes shown are part of a shipment of 250 cases of condensed milk sent by wholesale grocers of El Paso, Tex., to Mogollon, N. Mex., about 80 miles inland from Silver City. These cases weighed 42 lb. each or a total of 10,500 lb. They were delivered to the Atchison, Topeka & Santa Fe at Deming, N. Mex.

One of the most flagrant abuses of the parcel post in the southwest lies in the shipping of groceries from the larger towns to outlying points. One illustration is shipments of this nature moving over the Santa Fe from Albuquerque to Los Cerrillos, the final destination being Cuba, N. Mex., and other inland points. On April 28 a ton of flour was shipped in 50-lb. sacks; on May 21, half a ton of oats, 50 lb. of potatoes and a box of canned goods were handled; on May 23, 1,100 lb. of

Handling 242 Boxes of Condensed Milk by Parcel Post

flour was taken; on May 27, 1,400 lb. of sugar and potatoes, and on May 30, 2,620 lb. of sacked wheat.

As a further illustration, there was shipped from Deming to Mogollon on March 12, 70 sacks (3,500 lb.) of beans by parcel post, at a postage rate from Deming to destination of $1.04 per 100 lb. The freight rate for this same business is 30 cents from Deming to Silver City and $1.25 from Silver City to Mogollon by team, or $1.55 per 100 lb. through.

The reason for this traffic going by parcel post is evident. The freight rate from Albuquerque to Los Cerrillos is $1 per 100 lb. while the parcel post rate is $1.08 to destination. The star route carrier having the contract for handling the mail to Cuba and two or three other inland towns receives $2,600 a year. Prior to the establishment of parcel post he made two or three trips a week with a light buggy, but since the parcel post has come into action he is now required to make extra trips with a wagon.

The movement of fruit in this territory from Farmington, N. Mex., to points west of Albuquerque has been referred to previously in these columns. However, as a further example, on October 31 Santa Fe train No. 7 received at Lamy, N. Mex., 301 boxes of apples of 50 lb. each, or a total of 15,050 lb. It was necessary to transfer this to train No. 9 at Albuquerque, causing delay at both points. On November 3 train No. 7 loaded 179 boxes of apples at the same point, and on November 5, 213 boxes. These illustrations are typical of many of the abuses of the parcel post for which the railway company not only loses the freight or express revenue, but is obliged to carry the goods on its fast passenger trains at a very material actual loss.

"N. A. S. O." FIRST AID JAR

M. W. Alexander, West Lynn (Mass.), secretary of the National Affiliated Safety Organizations, announces that the Conference Board, composed of representatives of the constituents of this organization—large associations of manufacturers—has agreed on a standard first aid jar, made of glass, which contains a considerably larger number and variety of medicines and appliances than are generally found in railroad first-aid kits. An illustrated circular has been issued describing the jar. It is 9½ in. in diameter, 6 in. high and, complete, with contents, weighs about 12 lb. Besides the usual appliances and tools it contains eight two-ounce bottles of approved remedies. The bottles are ingeniously arranged in the jar so that their labels are visible through the sides of the jar, and any one bottle can be taken out without disturbing the others. These bottles contain aro-

First Aid to the Injured

matic spirits of ammonia, aqueous boric acid, alcoholic iodine, white wine vinegar, castor oil, burn ointment and Jamaica ginger. The jar has been made strong by special annealing treatment, and its walls are plain, so that the jar may easily be kept clean.

The Conference Board has issued a circular of brief instructions to laymen for first-aid treatment of common injuries and disorders, which includes illustrated directions for resuscitating persons who have suffered electric shocks; the inside of the cover of the jar is also filled with printed instructions.

It is the intention to furnish the jars and their contents at cost price, and they can be had from the National Founders' Association, 29 South La Salle street, Chicago, and the National Association of Manufacturers, 30 Church street, New York.

General News Department

The hearing at Chicago before the board of arbitration on the demands of the enginemen on the Western railroads was resumed on January 4.

E. T. Howson, engineering editor of the *Railway Age Gazette*, will address the Detroit Engineering Society on January 8, on "Heavy Railroad Construction Work."

The Lake Erie & Eastern, a new road, eight miles long, giving the New York Central lines access to large industries in Youngstown, Ohio, has been opened for business.

The new line of the Louisville & Nashville from Winchester, Ky., to Irvine, was opened for business December 28.

On December 21 the machine shops of the Lake Erie & Western at Tipton, Ind., were destroyed by fire. Much machinery was also damaged. The estimated loss is $20,000.

An officer of the National Railways of Mexico is reported as being in Dallas, Tex., for the purpose of leasing 1,000 box cars from the Texas & Pacific. It is understood that the Mexican lines need large numbers of freight cars for use during the next three months.

The large shops of the Baltimore & Ohio at Baltimore resumed work January 4 in every department, about 2,000 employees being put at work. The shops of the Big Four at Beech Grove, Ind., which had been closed for some time, resumed work January 1, with about 2,400 men.

Within the past few years, through the co-operation of the livestock and agricultural departments of the Nashville, Chattanooga & St. Louis, more than 2,000 head of pure bred cattle have been placed in the territory served by the road, many of them in counties where before few such animals could be found.

The Pennsylvania Railroad reports no passenger killed in a train accident in 1914 on the entire system, east and west of Pittsburgh; 16,303 miles of road. The number carried was 188,411,876; passenger train miles, 67,389,381. The lines east of Pittsburgh in the past two years carried 311,675,794 passengers and not one of them was killed in an accident to a train.

The California State Railroad Commission has sent to the Senate committee on post offices, at Washington, a letter recommending a reasonable adjustment of the compensation to be paid to railroads for carrying parcel post matter. The commission acts on the request of the Western Association of Short Line Railroads, and endorses the railroads' statement that if they are forced to carry certain traffic at unremunerative rates the remaining traffic must bear an undue share of the burden.

Chairman Adamson, of the House Committee on interstate and foreign commerce, has introduced in Congress a bill designed to strengthen the commodities clause of the interstate commerce law so as to more completely divorce interstate carriers from all industrial operations. After two (or three) years he would make it unlawful for any railroad subject to the act to regulate commerce to transport any commodity in which at that time, or in the past, it had an interest, or which had been mined or produced from lands owned or controlled by it.

The Pennsylvania Railroad has issued a statement to the effect that in the year ending June 30 last, the road paid one dollar for personal injuries for every 1,579 car miles, and that the average that year for 44 railroad systems for which statistics have been compiled was 740 car miles per one dollar paid. In other words, for each 1,000 miles run by cars the Pennsylvania paid out in damages 63 cents, while the average for 44 roads was 135 cents, more than double the Pennsylvania's burden. The cost to 40 of the principal railroad systems in this country for personal injuries for the year ending June 30 was $29,996,617. There were fewer accidents in 1914 than in 1913, but the amount paid for personal injuries was greater by $3,593,179. It has been estimated that the cost per year for personal injuries on all of the railroads in the country is not less than $57,000,000.

Finley Yard, the new gravity classification yard of the Southern Railway, near Birmingham, Ala., containing thirty miles of track, with a capacity of 2,000 cars, has just been placed in service. The buildings include a 25-stall roundhouse of reinforced concrete with a 90-foot electrically-operated turntable; a concrete coaling station with an overhead storage capacity of 1,000 tons, and water, sand and cinder handling facilities. Electric lights and a complete system of fire protection have been provided. The road will concentrate at Finley work which has been done at four different points scattered over a territory of ten miles.

The Mail Pay Committee calls attention to the fact that since the outbreak of the war in Europe the government has shipped nearly 200 tons of gold, worth about $99,000,000, from Philadelphia to New York without cost for railroad transportation. The gold was sent by parcel post. It was packed in canvas sacks, each containing $5,000 and weighing a trifle under 19 lb., and 19,800 such sacks were carried. The postage required, at the ordinary parcel post rates, was $4,554, but this was merely a shifting of funds from one department of the government to another. The railroad furnished, altogether, four special cars. As an extra precaution, requested by the postal authorities, the cars were detached from the regular trains some miles from destination and hauled the remainder of the way by special locomotives. Round trip transportation was provided for more than 100 postal clerks and inspectors who accompanied the gold as guards and for each of whom the railway company was obliged to assume the same liability as for a passenger paying full fare. All of this was done without any compensation to the railroad beyond the regular monthly payment for the routine mail service. In similar manner, $5,000,000 was sent from New York to Boston and $840,000 from New York to Ottawa.

"By passing Chairman Moon's railway mail pay rider in the Post Office appropriation bill, the House of Representatives has voted authority to the post office department to confiscate the facilities of the railroads." This fact is brought to the attention of the public in a circular from Ralph Peters, chairman of the Committee on Railway Mail Pay. Unless the Senate bars its final enactment, the Moon rider will force the railroads, under penalty of $5,000 for each refusal, to carry the mails for whatever the postmaster general chooses to pay. "Even should he in all cases allow the maximum rates permitted by the Moon rider," says Mr. Peters, "railway mail pay will be heavily cut and the present underpayment and injustice to the railroads greatly increased." It will be recalled that Chairman Moon told the House, during debate, that his rider would enable the post office department to "save" $8,000,000 annually out of the already inadequate payments to the railroads for carrying the mails. "The greatest wrong would be done in the case of the parcel post, for the carrying of which the railroads are today underpaid not less than 50 per cent. Chairman Moon apparently wishes to make this underpayment 100 per cent, for he announced in the House of Representatives that his rider would provide the post office department with machinery whereby railroad transportation could be obtained for *all the parcel post* 'probably without any additional compensation.'"

Toronto Terminal Company

This is the name of an organization which has been formed by the Canadian Pacific and the Grand Trunk to build the extensive new terminal facilities in the city of Toronto which have been under consideration for two or three years past. The plans include a passenger station and large freight station. It is understood that each of the two companies will

take one-half of the stock, and be responsible for one-half the financial burden. The appointment of J. W. Leonard, of the Canadian Pacific, as the head of the terminal company was announced in our last issue.

Valuation of the Pere Marquette

The Pere Marquette Railroad has a reproduction value of $96,962,771. This is the announcement on the completion of an appraisal completed by Dean Mortimer E. Cooley, of the University of Michigan, and submitted to the receivers of the road and the State Railroad Commission. The reproduction cost, less depreciation, is given by the report as $78,545,241. Dr. Cooley, with a staff of assistants, has been at work on the appraisal during the last eight months. The cost of the road a mile is figured at $45,392, or $36,770 less depreciation. There are 2,586.73 miles of track in Michigan and 2,965.87 miles in five states and Canada.

Progress in Rogers Pass Tunnel

During the month of December the pioneer tunnel at the west end of the five-mile double track tunnel of the Canadian Pacific now being driven at Rogers Pass, B. C. (see *Railway Age Gazette*, December 11, 1914), was driven 852 ft. and the pioneer tunnel at the east end 544 ft. The center heading in the west end of the main tunnel proper was driven 686 ft. and in the east end 523 ft. Work is now being started on the enlargement of the center heading in the east end to the full section. From these figures it can be seen that the unusual records made in the early months of this construction are being continued.

Passenger Suffocated in New York Subway

As a result of a small fire in a manhole at the side of the Interborough Subway at Broadway and 53d street, Manhattan, New York City, on the morning of January 6, two train-loads of passengers were thrown into a panic and nearly two hundred persons, largely women, were partly suffocated or injured by being trampled on; and the injuries of one women were fatal. The fire was caused by a short circuit in power cables at the connection with the power house, and the chief trouble was from dense volumes of smoke from burning insulating material which gradually filled the tunnel for a considerable distance. The two trains were stalled (by the cutting off of the power because of the accident to the wires) a few hundred feet away, and their rear ends were not far from an emergency exit; but there appears to have been considerable delay in reaching and using the means of escape. Passengers who were prompt to try to escape seem to have got out safely. No trains were run for about eight hours, and the excitement in the city was the greatest in the ten years' history of the subway.

Safety on the Cumberland Valley

M. C. Kennedy, president of the Cumberland Valley Railroad, a part of the Pennsylvania System, has addressed a letter to employees congratulating them on the almost total absence of accidents of all kinds during the year 1914. He says:

"During the year just closed the Cumberland Valley Railroad transported approximately eight and a quarter million tons of freight and two million passengers without the loss of life of a passenger or one of its 2,100 employees, and without injuring a passenger.

"While there have been minor accidents to employees, not so much as a finger or a toe has been amputated, and with the exception of one fractured ankle, not a leg nor an arm broken.

"Without taking into consideration the few slight accidents on industrial sidings and in yards there has not been a wreck, in the general acceptation of that term. The wreck crew has only been called seven times during the year and the total cost of wrecking has been insignificant.

"This splendid record, of which I feel justly proud, and which I do not believe has been equaled by any railroad of its size and same density of traffic, is not attributable to any one man but to the hearty co-operation of every officer and employee in their untiring efforts to make the Cumberland Valley the best and safest railroad in the United States.

"I congratulate you and ask a continuance of that loyal support without which such a record could not have been made; and I extend to you one and all my best wishes for a happy and prosperous New Year."

The Cumberland Valley operates 164 miles of road; receipts, by last annual report to the Interstate Commerce Commission, one year, $3,521,447; train miles, 1,515,138.

Presidents' Conference Committee on Valuation

Thomas W. Hulme, general secretary of the Presidents' Conference Committee on the Federal Valuation of Railways, has just issued a statement reviewing the work of this committee for the past year. After reviewing the orders of the Interstate Commerce Commission and the various circulars which have been issued by the government, the report states that the inventory has been practically completed on four roads, the Norfolk Southern; the Atlanta, Birmingham & Atlantic; the Texas Midland, and the New Orleans, Texas & Mexico; and that it will be completed in the near future on the Kansas City Southern and the San Pedro, Los Angeles & Salt Lake. Tentative prices have been applied by the local government engineers, but these are subject to review at Washington. Both the government and the railway organizations are gathering cost data to aid in this review. It is realized that before these prices are applied and the valuation is made some fundamental questions must be decided, some general principles established, and some terms in the valuation act defined. It is probable that there will be a general hearing on these matters during the later part of the winter, and preparation is being made for their full consideration by the government and the railways.

The report also contains a list of all the communications issued by the committee for the guidance of the railways in the preparation of the information required by the government.

Dr. Hadley on the New Haven Situation

President Arthur T. Hadley, of Yale University, speaking before the Twentieth Century Club of Springfield, Mass., this week, on the railroad situation, with special reference to the New York, New Haven & Hartford, of which company he is a director, said, in part:

"The present condition of the New Haven road was brought about by a combination of some unwise finance with a great deal of unwise operation and unwise politics.

"In 1913 the road paid $9,000,000 more for wages and fuel than would have been the case at the prices which prevailed ten years earlier, and received no more for its services. . . . Methods of handling freight had become more economical as the volume of traffic increased. Methods of handling passengers became more expensive under the same conditions. The authorities of New York state compel the New Haven road to do its commutation passenger business at rates which mean a direct loss of nearly $1,000,000 a year. The United States government penalizes the road an equal amount for the carriage of the mails. These three things, taken together, would have involved a serious reduction of the dividend even if there had been no outside purchases of any kind. . . .

Loss and Damage Claims

The Central Safety and Efficiency Committee of the San Pedro, Los Angeles & Salt Lake on January 1 issued a circular urging a special campaign among the employees to reduce the amount of loss and damage claims. It is pointed out that in the last four years payments of such claims have totaled nearly $250,000 on this road, which means that out of every dollar received for the handling of freight one cent is paid back to the shipper or consignee in the form of claims for merchandise lost or damaged. The circular gives the figures for the past five years, and also the amount of claims paid on various commodities during the last six months of the fiscal year 1914. The following suggestions are given as to how the various employees may help to reduce the amount of such claims:

"The receiving clerk may help by seeing that he receives all the freight he signs for. He is the man to reject consignments improperly prepared for shipment.

"The trucker may help by careful trucking, and by being sure that the freight is loaded in the proper car.

"The stevedore or loader may help by careful stowing and bracing, and by supervising the work of the loader.

"The warehouse foreman may help by choosing suitable cars

for loading, and by seeing that cars selected are free from nails and other projections, and from oil or other refuse which may injure the lading.

"The switchman may help by avoiding unnecessary movements of the car, by careful signaling, and by making smooth couplings.

"The engineer may help by prompt and careful observance of signals, and by avoiding sudden and hard applications of the air brake.

"The conductor and brakeman may help by unloading and loading freight as though it were their own property, being cautious to see that it is put off at its correct destination, and by reporting instances of improper loading."

Automatic Train Stops

The New York State Public Service Commission, First District, has notified the Interborough Rapid Transit Company to proceed at once to equip its elevated lines with apparatus capable of preventing collisions. The resolution of the commission is as follows:

"Resolved that it is the sense of the commission that the elevated railroad lines of the Interborough Rapid Transit Company should be equipped with a signal system which will prevent collisions, and that the company be required to make an investigation and report to the commission within sixty days on such speed control, cab signaling or other improved signaling devices that will allow the minimum headway on the elevated railroads and provide the greatest factor of safety."

At present the rule for trains on the elevated lines is to run at all times with speed under control, except on certain curves, where automatic block signals are provided. Throughout the lines the stations are usually not more than one-quarter mile apart, limiting the speeds to a low rate.

The New York Central Railroad

Under the reorganization of the consolidated New York Central Railroad Company, two grand divisions will be established, the eastern under W. J. Fripp, general manager, with headquarters at Albany; and the western under D. C. Moon, general manager, with headquarters at Cleveland. Under Mr. Moon will be two general superintendents, Albert S. Ingalls in charge of lines between Buffalo and Toledo, and Frank H. Wilson, in charge of lines between Toledo and Chicago. Under Mr. Fripp will be three general superintendents, T. W. Evans in charge of lines between Buffalo and Syracuse, and between Montreal and Clearfield, Pa.; E. J. Wright, in charge of lines between Syracuse and the electric zone at New York; and Miles Bronson, in charge of the electric division.

Abraham T. Hardin will have general charge of operation, maintenance and construction as vice-president. Patrick E. Crowley will be in general charge of transportation on the consolidated lines between Chicago and New York as assistant vice-president.

The road will be divided into five operating districts: First, between New York and Syracuse; second, between Syracuse and Buffalo; third, between Buffalo and Toledo; and fourth, between Toledo and Chicago. The New York electrified zone constitutes a separate (fifth) district.

Chicago is called the western terminus of the road, but there are really three western termini, the other two being Zearing, on the former Chicago, Indiana & Southern, 96 miles west of Chicago, and Danville, on the same road, 128 miles south of Chicago. (See operating officers.)

Proposed Railway Legislation in Kansas

C. W. Kouns, general manager of the Atchison, Topeka & Santa Fe and chairman of the Kansas Committee on Relations of Railways to Legislation, has addressed two circular letters to the people of Kansas on proposed railway legislation in the state, requesting, on behalf of the 12 railway companies operating in Kansas, that a thorough investigation be made of proposed legislation having to do with railroad business. The letter states that the legislature this winter will have before it the so-called "full crew" bill which, the circular states, if enacted into the law would force the railways to spend approximately $2,000,000 every year for extra brakemen on freight trains without any compensating benefit to anybody except the men who want jobs as brakemen. There are other similar bills, one of which prohibits the running of trains of more than 50 cars, and another requires extensive changes in cabooses, cars, etc. One part of the letter is devoted to demonstrating that the full crew bill is not a safety measure, and that as far as safety is concerned a third brakeman would be of no more value on a freight train than would an extra man on a corn planter, or a load of hay, or at the pump as a means of safety.

The letter says: "As a matter of fact the Kansas railway workers who have jobs have never made application to the roads for a third brakeman for the freight train service. The full crew agitation is carried on wholly by, and in the interest of, those who want to force the railways by law to give them employment." Regarding the bill limiting the number of cars in a train to 50, the circular says: "This is a double-edged sword with a poisoned tip, not only providing for a superfluous man on every train, but in many instances for an additional or unnecessary train and engine crew, with an additional engine at heavy expense to the roads and their patrons. For example, if 51 cars of stock are offered for shipment an engine with one engineer, one fireman, one conductor and two brakemen at full pay would be required to move the fifty-first car, regardless of the capacity of the engine handling the 50-car train; or the fifty-first car would have to be declined or delayed, no matter how important the shipment."

I. C. C. Report on Derailment Near Bigelow, Minn.

The Interstate Commerce Commission has just issued a report, prepared by H. W. Belnap, chief of the division of safety, on the derailment of passenger train No. 2 of the Chicago, St. Paul, Minneapolis & Omaha near Bigelow, Minn., on February 9, 1914, which resulted in the death of one pasesnger and one express messenger, and the injury of 11 passengers and 6 employees. This train, which consisted of 1 mail car, 1 express car, 1 buffet car, 2 sleeping cars, 1 chair car and 1 smoking car, all of wooden construction except the mail and chair cars, was en route from Omaha to Minneapolis. It was derailed at a point about 2½ miles east of Bigelow while running at an estimated speed of 45 miles an hour. This portion of the line is single track and was tangent for more than a mile in each direction from the point of accident with a 1 per cent descending grade. It was laid with 80-lb. rails supported on 18 oak and cedar ties per rail in 18 in. of gravel ballast.

In the derailment the engine broke away from the cars, coming to a stop about 1,650 ft. from the point of derailment. The forward pair of engine truck wheels and the rear pair of tender truck wheels were derailed, as were all the cars in the train.

The accident was caused by a broken rail weighing 80 lb. per yard, rolled by the Carnegie Steel Company in September, 1899. It was broken into a large number of pieces, 74 of which were recovered. A detailed study of this rail showed that the failure resulted from a split head which had developed during service. The steel was a very coarse-grained Bessemer steel of about normal carbon content, without excessive segregation about the split; but the inner portions had a carbon content considerably above the maximum specified for rails of this type and weight. The metal was decidedly unhomogeneous, badly streaked and laminated, especially in the web, and contained microscopic fissures.

Because of the frequency with which split rails are encountered, James E. Howard, engineer physicist of the commission, prepared a lengthy discussion of this type of failure which is included with the report.

Grand Trunk Orders Pay Reduced

Employees of the Grand Trunk belonging to the unions, said to number 14,000, have been notified by Howard G. Kelley, first vice president, that on account of the falling off in business they will be asked to accept a reduction of wages dating from April 1 next. Employees on the Grand Trunk Pacific have received a similar notice. These notices have been sent to the men through the chief officers of the respective labor unions. The men are said to have replied that on no account will they accept a reduction. Mr. Kelley's letter reads:

"In view of the serious contraction in business and the consequent alarming decrease in earnings, the company is confronted with a situation which must be relieved as quickly as possible. The general downward tendency of rates, both passenger and freight, without any compensating reduction in cost of operation,

has narrowed the margin of receipts over expenses to such an extent that with any further continuation of the present conditions this company will be confronted with a deficit.

"It, therefore, becomes necessary, much to the regret of the management, to notify you that the company will ask for a reduction in the rates of pay, beginning with April 1, 1915. The extent of the reduction will be based upon the results of operation for the half-year ending December 31, 1914, and will be communicated to you after January 1, 1915."

The G. T. P. letter is the same, save that the cut is to take effect at once instead of three months hence. On the Grand Trunk there are approximately 1,500 enginemen, 1,500 firemen, 1,500 conductors, 3,500 brakemen and baggagemen, 1,500 telegraphers and 4,500 sectionmen, making a total of 14,000, all said to be members of the international unions. On the Grand Trunk Pacific it is understood that only the enginemen, firemen, conductors and brakemen are embraced in the proposed reduction.

Nothing is made public as to what, if any, contracts are in force between employer and employee, or, if in force, for how long a time.

Summary of Revenue and Expenses of Steam Roads

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for October, 1914, are as follows:

Railways operating 228,233 miles of line are covered by this summary, or about ninety per cent of all steam railway mileage in the United States. Their operating revenues for the month of October, 1914, amounted to $266,793,865. This amount includes revenues from freight and passenger traffic, from carrying mail and express, and from miscellaneous sources connected with rail and auxiliary operations. Compared with October, 1913, these operating revenues show a decrease of $29,507,027. Total operating revenues per mile averaged $1,169 in October, 1914, and $1,314 in October, 1913, a decrease of $145, or 11 per cent.

Operating expenses, which include the cost of maintaining track and equipment, operating trains, securing traffic, and of administration, amounted to $179,431,409. This was $21,562,782 less than for October, 1913. These operating expenses per mile of line averaged $786 in October, 1914, and $891 in October, 1913, a decrease of $105 per mile, or 11.8 per cent.

Net operating revenue, that is, total operating revenues of rail and auxiliary operations less operating expenses amounted to $87,362,456, which was $7,944,245 less than for October, 1913. Net operating revenue per mile of line averaged $383 in October, 1914, and $423 in October, 1913, a decrease of $40 per mile, or 9.4 per cent.

Taxes for the month of October amounted to $11,522,028 or $50 per mile, a decrease of 1.6 per cent over October, 1913.

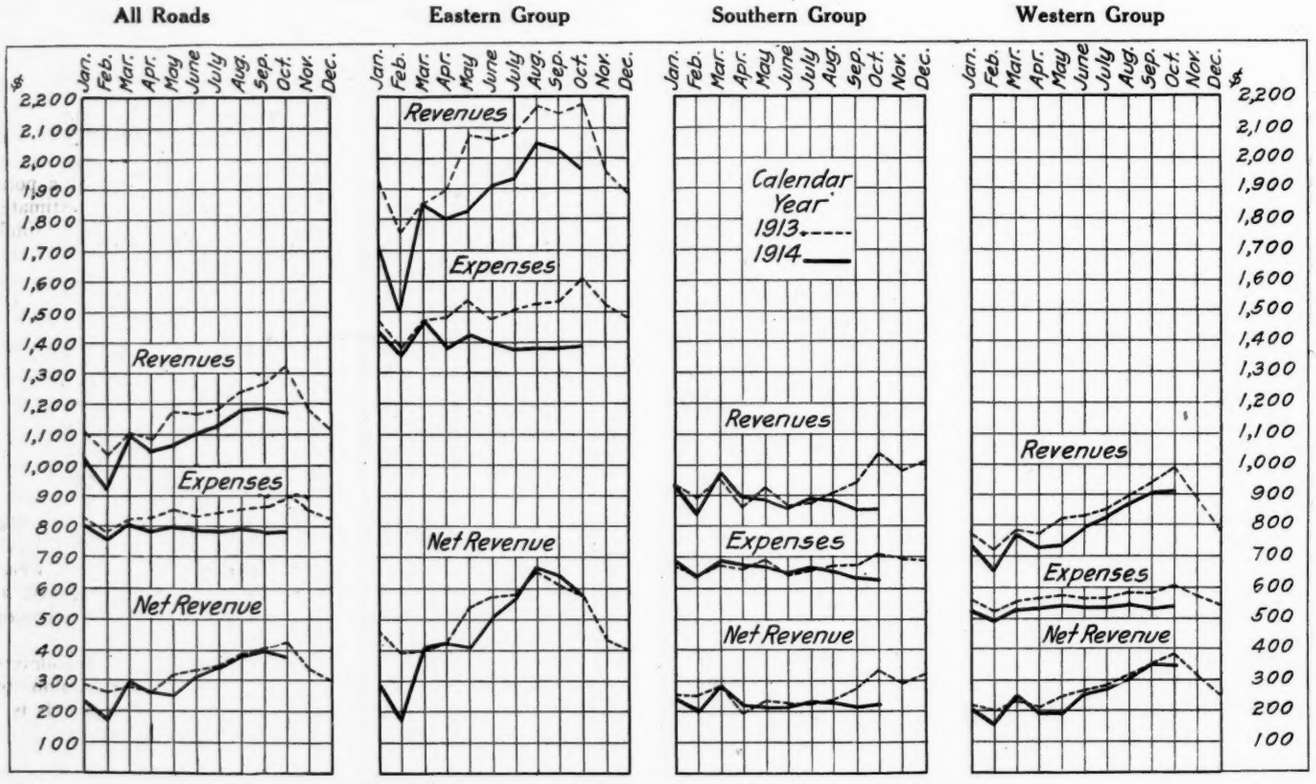
Operating income, which is net revenue from rail and auxiliary operations, less uncollectible revenues and taxes, averaged $332 per mile of line, and in October, 1913, $371, thus decreasing $39, or 10.6 per cent. Operating income for each mile of line for each day in October averaged $10.71, and in October, 1913, $11.98. Operating income is that proportion of their operating receipts which remains available to the railways for rentals, interest on bonds, appropriations for betterments, improvements, new construction, and for dividends.

The railways of the Eastern district show a decrease in total operating revenues per mile of line as compared with October, 1913, of 10.1 per cent, those of the Southern district a decrease of 17.3 per cent, and those of the Western district a decrease of 9.3 per cent.

Operating expenses per mile decreased 13.9 per cent in the East, decreased 10.7 per cent in the South, and decreased 9.1 per cent in the West. Net operating revenue per mile increased 0.2 per cent in the East, decreased 31.6 per cent in the South, and decreased 9.6 per cent in the West. Taxes per mile show a decrease of 3.9 per cent in the East, and increases of 0.4 per cent in the South and West. Operating income per mile increased 0.8 per cent in the East, decreased 35.6 per cent in the South, and decreased 10.9 per cent in the West.

The operating ratio for October, that is, the per cent of total operating revenues absorbed in operating expenses, was 67.3 per cent, which is comparable with 67.8 per cent in October, 1913, and 63 per cent in October, 1912. The operating ratio in the Eastern district for October was 70.5 per cent, as compared with 73.6 per cent in 1913; was 73.7 per cent in the Southern district as compared with 68.3 per cent in 1913; was 61.9 per cent in the Western district as compared with 61.8 per cent in 1913.

Comparison of returns for four months of the current fiscal year with the corresponding months of the previous fiscal year reveals a decrease in total operating revenues per mile of 6.9 per cent, a decrease in operating expenses per mile of 8.6 per



Monthly Revenues and Expenses per Mile of Line in 1914

cent, and a decrease in net operating revenue per mile of 3.2 per cent.

This net operating revenue per mile increased 1.6 per cent in the East as compared with the corresponding period of the previous year, decreased 15 per cent in the South, and decreased 3.9 per cent in the West.

When the returns for the ten months of the calendar year 1914 are compared with the corresponding months of 1913, they show a decrease in total operating revenues per mile of 6.7 per cent, a decrease in operating expenses per mile of 6 per cent, and a decrease in net operating revenue per mile of 8.6 per cent. This net operating revenue per mile decreased 10.8 per cent in the East as compared with the corresponding period of the previous year, decreased 8.9 per cent in the South, and decreased 6.3 per cent in the West.

The diagram shows the variations in operating revenues, operating expenses, and net operating revenue per mile for the separate months of the calendar year 1913, and of the calendar year 1914 to date.

The following table shows the per cent of operating revenues consumed by such class of expenses:

PER CENT OF TOTAL OPERATING REVENUES

	October, 1914				Four months of the fiscal year 1915
	United States	Eastern district	Southern district	Western district	
Freight revenue	70.8	69.9	72.8	71.3	67.9
Passenger revenue	20.2	20.2	19.6	20.3	23.2
Mail revenue	1.9	1.5	1.7	2.2	1.8
Express revenue	2.2	2.3	2.3	2.1	2.2
All other revenues	4.9	6.1	3.6	4.1	4.9
Maintenance of way and structures	12.6	12.1	13.7	12.6	13.0
Maintenance of equipment	16.5	17.7	20.1	14.1	16.6
Traffic expenses	1.9	1.6	2.6	1.9	1.9
Transportation expenses	33.5	36.1	34.4	30.8	33.2
General expenses	2.3	2.3	2.7	2.2	2.3
All other expenses	0.5	0.7	0.2	0.3	0.5
Total operating expenses	67.3	70.5	73.7	61.9	67.5

Disastrous Collision on the Great Eastern

A press despatch from London, January 1, reports a collision on the Great Eastern, near Ilford, on the morning of that day, in which ten persons were killed and many others injured. Ilford is five miles from London and the trains appear to have been suburban passenger trains running toward the city.

American Electric Railway Association

The mid-year meeting of the American Electric Railway Association and the joint dinner with the American Electric Railway Manufacturers' Association, will be held at the New Willard Hotel in Washington on January 29. At the meeting proper at 10 a. m. addresses will be made by Dwight W. Morrow, of J. P. Morgan & Company, who will discuss electric railways from the banker's standpoint; N. C. Kingsbury, vice-president of the American Telephone & Telegraph Company, who will speak on publicity, and T. S. Williams, president of the Brooklyn Rapid Transit Company, who will consider the code of principles adopted by the association at its last convention. At 2 o'clock the delegates will be received at the White House by President Wilson. At 7 p. m. there will be the annual dinner. The speakers for this dinner have not yet been announced, but among others Arthur S. Williams will announce the winner of the Anthony N. Brady medal for the electric railway which has done the most during the year to conserve the life and health of its passengers and employees, and C. L. Henry, president of the Indianapolis & Cincinnati Traction Company, will speak from the railways' standpoint. Arrangements have been made for a special train leaving New York on the night preceding the dinner for the convenience of the New York delegates.

Nominations for A. R. E. A.

The nominating committee of the American Railway Engineering Association has recommended for election the following members: President, Robert Trimble, chief engineer, maintenance of way, Pennsylvania Lines, Northwest System; first vice-president, A. S. Baldwin, chief engineer, Illinois Central; second vice-president, J. D. Sullivan, chief engineer, Canadian Pacific Lines West; secretary, E. H. Fritch; treasurer, G. H. Bremner, assistant district engineer, Interstate Commerce Commission, Division of Valuation, Chicago.

New England Railroad Club

At the regular monthly meeting of the New England Railroad Club at the New American House, Boston, Mass., on Tuesday evening, January 12, a paper will be presented by Roy V. Wright, managing editor of the *Railway Age Gazette*, entitled "Making Friends."

MEETINGS AND CONVENTIONS

The following list gives the names of secretaries, dates of next or regular meetings, and places of meeting of those associations which will meet during the next three months. Hereafter the full list of meetings and conventions will be published only in the first issue of the Railway Age Gazette for each month.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEWARK.—John J. Kautzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, Newark.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER, 1914.

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total. inc. misc.	Operating expenses: Maintenance: Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.	Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Alabama & Vicksburg	143	$77,715	$28,017	$117,778	$19,983	$35,158	$3,367	$46,823	$3,000	$5,484	$113,816	$3,962	$7,000	—$3,038	—$37,335
Alabama Great Southern	309	276,733	78,630	386,837	44,454	94,749	13,216	134,451	3.254	9,723	299,897	86,941	15,493	71,433	52,274
Ann Arbor	301	134,639	42,996	191,157	24,046	27,522	6,140	83,459	382	7,074	148,624	42,533	13,880	28,653	—12,853
Arizona Eastern	367	115,266	24,396	151,711	26,846	20,221	2,164	41,980	992	10,012	102,216	49,495	13,100	36,393	—53,634
Atchison, Topeka & Santa Fe	8,514	5,678,369	1,832,193	8,212,065	1,163,735	1,405,124	171,451	2,299,247	.....	154,330	5,181,306	3,030,758	367,747	2,662,036	95,450
Atlanta, Birmingham & Atlantic	646	148,648	37,038	202,890	28,438	45,006	12,927	93,286	.....	9,673	189,329	13,561	8,000	5,530	—64,020
Atlanta & West Point	93	49,266	33,563	96,813	13,066	23,020	5,157	31,372	1,589	4,522	78,726	18,088	7,125	10,963	—13,945
Atlantic & St. Lawrence	167	84,624	24,809	120,047	23,255	19,842	4,033	51,448	.....	3,391	101,969	18,078	10,800	7,278	—26,540
Atlantic Coast Line	4,697	1,770,995	578,721	2,541,495	364,248	440,770	58,885	911,619	7,561	75,967	1,857,197	684,299	138,000	546,172	—442,836
Baltimore & Ohio—System	4,516	5,209,074	1,106,478	6,879,270	738,862	1,292,029	164,829	2,888,147	49,451	171,946	5,305,213	1,574,056	265,942	1,305,798	48,678
Baltimore & Ohio Chicago Terminal	79	.....	509	119,731	14,985	18,735	762	55,614	1,250	4,384	95,729	24,002	19,021	4,981	—9,178
Bangor & Aroostook	631	241,658	55,614	317,476	47,827	51,561	2,201	93,049	903	9,268	204,607	112,869	8,750	104,119	—5,191
Belt Ry. Co. of Chicago	24	.....	.....	266,488	12,765	22,017	572	96,476	.....	6,337	138,168	128,320	10,347	117,973	37,781
Bessemer & Lake Erie	204	507,394	26,364	545,552	49,407	157,170	8,702	145,181	305	10,809	366,978	178,574	20,002	158,569	—34,681
Birmingham Southern	44	33,124	712	59,753	12,540	8,965	435	22,991	.....	3,725	48,655	11,097	2,949	8,148	—22,636
Boston & Maine	2,302	2,205,340	1,202,424	3,745,539	579,645	551,329	33,484	1,669,594	14,543	87,769	2,936,364	809,175	141,500	667,675	208,345
Buffalo & Susquehanna R. R. Corporation	253	112,343	6,829	122,181	21,231	33,559	961	37,247	.....	5,136	98,124	24,057	2,600	21,457	.....
Buffalo & Susquehanna Railway	91	13,224	5,735	21,360	3,242	6,227	419	12,071	7	2,327	24,294	—2,933	1,600	—4,533	19,033
Buffalo, Rochester & Pittsburgh	586	581,043	87,264	693,393	86,266	174,490	10,690	254,526	1,238	17,866	545,075	148,318	20,000	128,199	—109,929
Carolina, Clinchfield & Ohio	248	150,665	12,074	166,185	15,511	21,080	6,388	34,392	.....	8,732	85,548	80,638	14,250	66,379	—56,322
Carolina, Clinchfield & Ohio of S. C.	18	8,414	1,338	10,031	1,044	79	1,704	1,970	.....	754	5,549	4,482	750	3,724	—5,765
Central of Georgia	1,924	665,575	227,159	1,002,012	122,923	191,770	34,184	354,584	1,145	33,074	734,232	267,780	41,804	225,469	—104,794
Central New England	304	258,939	36,252	310,055	121,767	30,764	1,032	119,993	.....	4,290	277,845	32,210	12,000	20,210	—111,950
Charleston & Western Carolina	341	124,367	22,816	154,182	29,728	27,567	3,053	55,605	.....	4,736	120,690	33,492	5,000	28,492	—17,345
Chesapeake & Ohio Lines	2,367	2,273,975	427,997	2,880,999	352,118	648,559	53,401	1,030,089	18,499	72,206	2,174,872	706,127	109,922	595,921	—231,783
Chicago & Alton	1,033	791,591	289,229	1,179,305	148,020	291,925	37,285	452,218	10,061	30,082	969,590	209,714	44,850	164,683	82,957
Chicago & Eastern Illinois	1,282	843,266	208,700	1,143,498	144,838	269,008	26,465	457,262	7,114	37,202	941,589	201,909	56,900	144,924	—20,898
Chicago & Erie	270	359,836	44,638	445,192	69,289	61,362	20,047	223,712	2,241	11,923	374,353	70,838	23,479	47,359	92,661
Chicago & North Western	8,108	3,957,685	1,557,777	6,202,041	797,491	1,150,678	107,432	2,449,674	48,576	145,824	4,599,534	1,602,507	375,000	1,227,289	—602,576
Chicago, Burlington & Quincy	9,377	5,629,179	1,590,627	7,903,284	711,247	1,251,748	113,174	2,572,753	62,006	178,541	4,889,469	3,013,815	307,384	2,706,431	66,447
Chicago, Detroit & Can. Gd. Trunk Jctn.	60	59,530	13,563	80,640	14,216	15,410	1,521	45,634	.....	1,951	78,731	1,909	2,870	—973	—21,462
Chicago, Indiana & Southern	359	306,551	23,124	341,283	35,634	108,613	7,892	127,683	.....	9,946	291,083	50,200	20,085	30,089	20,150
Chicago Junction	12	.....	.....	157,182	19,735	16,731	1,225	87,595	1,314	4,387	129,673	27,509	2,223	25,286	—15,559
Chicago, Milwaukee & St. Paul	10,067	5,219,983	1,390,275	7,379,909	903,895	1,181,942	148,264	3,073,818	59,193	151,663	5,332,408	2,047,501	401,429	1,646,072	—783,766
Chicago, Peoria & St. Louis	255	101,321	21,286	130,605	23,413	24,752	6,009	57,573	.....	5,350	117,097	13,507	5,700	7,807	31,133
Chicago, Rock Island & Gulf	477	212,067	47,919	279,722	32,085	49,897	9,818	103,853	1,670	7,676	204,999	74,724	6,318	68,310	—11,073
Chicago, Rock Island & Pacific	7,852	4,010,359	1,386,496	5,804,093	904,857	904,587	152,533	2,322,803	34,961	138,761	4,453,108	1,350,986	295,296	1,055,228	—33,830
Chicago, St. Paul, Minneapolis & Omaha	1,753	957,710	392,073	147,487	130,432	187,251	30,439	583,945	13,704	36,046	977,963	500,524	86,853	413,137	—115,018
Chicago, Terre Haute & Southeastern	374	153,579	15,481	173,257	26,822	49,119	3,159	58,137	847	11,488	149,573	24,685	11,500	13,185	6,684
Cincinnati, Hamilton & Dayton	1,015	581,219	112,052	773,672	114,590	164,743	19,016	351,445	.....	18,096	667,890	105,783	40,042	65,558	69,263
Cincinnati, New Orleans & Texas Pacific	337	559,512	149,746	752,366	76,741	189,642	25,766	241,420	6,684	20,523	560,777	191,590	31,000	160,590	—90,589
Cincinnati Northern	246	110,530	14,680	130,198	13,731	24,792	3,032	42,446	.....	3,188	87,189	43,008	5,000	38,008	63,749
Cleveland, Cincinnati, Chic. & St. Louis	2,361	1,870,095	629,392	2,759,200	318,434	589,050	103,774	1,122,912	23,791	60,611	2,212,552	546,648	130,000	413,922	296,861
Colorado Midland	338	135,923	13,752	166,623	23,665	33,205	7,401	63,815	868	5,881	134,835	31,788	8,530	23,258	18,680
Cumberland Valley	164	170,991	54,786	240,346	72,434	37,830	3,883	83,556	797	7,463	205,964	34,382	5,910	28,472	—33,155
Delaware & Hudson Co.—R. R. Dept.	881	1,583,705	203,208	1,887,395	136,110	334,604	22,550	679,420	10,113	62,062	1,244,176	643,220	56,250	586,750	.....
Detroit & Mackinac	400	52,425	26,496	86,026	14,553	13,164	3,069	34,348	.....	2,713	67,847	18,180	10,199	7,981	—12,007
Detroit & Toledo Shore Line	79	127,122	.....	127,440	12,214	9,643	2,909	35,412	.....	3,191	63,370	64,071	6,300	57,771	—10,761
Detroit, Grand Haven & Milwaukee	191	154,000	47,000	240,405	34,625	34,609	6,512	118,639	721	5,057	200,164	40,241	3,360	36,811	—7,827
Duluth & Iron Range	292	58,437	19,814	85,782	65,729	64,764	804	54,630	2,218	7,997	196,142	—110,360	4,194	—114,555	—172,054
Duluth, Missabe & Northern	364	72,073	28,042	106,053	39,360	50,661	2,029	60,706	2,258	19,493	174,506	—68,453	5,443	—73,896	—218,320
Duluth, South Shore & Atlantic	628	104,985	70,923	197,043	32,334	34,033	8,264	85,575	3,796	8,212	172,214	24,829	19,000	5,814	—21,144
El Paso & Southwestern Co	1,027	434,003	93,134	571,744	69,420	80,751	16,755	148,448	5,842	23,440	341,225	230,519	23,211	207,302	27,311
Elgin, Joliet & Eastern	778	457,322	4	510,172	56,405	124,272	5,353	182,038	.....	18,157	386,202	123,950	32,833	91,117	—202,705
Erie	1,988	3,167,887	700,270	4,270,025	442,657	948,453	96,396	1,674,468	27,831	96,073	3,260,362	1,009,662	171,370	836,836	—200,987
Florence & Cripple Creek	87	80,749	11,106	93,772	5,489	7,748	2,228	27,665	.....	4,152	47,282	46,490	5,658	40,832	316
Florida East Coast	696	202,904	120,051	370,416	54,428	59,453	6,836	117,537	2,817	15,839	255,554	114,862	18,000	96,862	14,349
Fort Worth & Denver City	454	395,306	139,836	559,220	44,343	67,428	6,715	217,101	3,822	14,316	353,724	205,496	9,679	195,817	82,748
Georgia	307	177,629	54,476	248,953	32,541	49,645	11,517	99,882	361	7,857	201,804	47,149	5,706	41,438	—31,170
Grand Rapids & Indiana	576	255,337	127,455	417,636	40,948	88,372	10,671	188,223	12	14,258	342,484	75,152	24,270	50,882	—20
Grand Trunk Western	347	387,000	140,000	576,257	146,925	101,581	18,079	265,745	3,332	13,484	549,145	27,112	35,920	—8,848	—31,426
Gulf & Ship Island	308	96,134	20,718	124,509	17,702	30,642	2,595	34,606	195	6,460	92,199	32,311	7,114	25,197	—16,676
Gulf, Colorado & Santa Fe	1,937	1,195,369	249,929	1,513,605	184,264	200,578	26,238	503,232	.....	35,922	950,234	563,371	45,231	517,858	122,320
Hocking Valley	351	420,622	67,301	527,154	61,873	105,115	8,569	185,515	.....	13,717	374,790	152,364	38,800	113,564	—30,885
Ilinois Central	4,769	3,648,523	1,032,218	5,077,115	713,219	1,128,801	107,973	1,906,276	31,169	138,982	3,993,120	1,083,995	269,000	812,334	—204,771
Indiana Harbor Belt	105	.....	.....	279,369	39,089	27,878	2,748	129,366	.....	7,482	206,563	72,806	7,785	64,910	10,004
International & Great Northern	1,160	677,965	144,818	879,379	100,915	123,949	22,816	323,766	2,680	29,536	603,663	275,716	35,000	240,710	—73,246
Kanawha & Michigan	177	170,719	28,987	207,109	32,804	42,512	2,751	69,675	.....	6,729	154,472	52,637	11,375	41,262	—18,238
Kansas City Southern	827	675,768	123,770	879,047	84,171	98,350	28,436	300,840	.....	47,967	554,276	324,771	47,089	277,482	—83,088
Lake Erie & Western	906	343,526	54,886	422,557	75,181	87,587	10,420	189,080	.....	12,085	374,351	48,206	24,513	23,693	—31,000

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues				Operating expenses						Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Lake Shore & Michigan Southern	1,852	$2,477,858	$897,160	$3,892,159	$361,714	$830,816	$106,725	$1,440,670	$45,501	$162,694	$2,948,119	$944,039	$210,000	$733,614	$290,910
Lehigh & Hudson River	97	133,096	8,941	143,398	19,210	19,411	1,162	55,766	.....	5,782	99,260	44,137	4,150	39,987	16,143
Lehigh & New England	294	200,164	1,070	208,825	30,395	29,744	1,914	48,521	.....	5,711	116,356	92,469	5,670	86,800	15,356
Lehigh Valley	1,444	3,026,962	307,036	3,527,395	395,924	676,359	68,207	1,345,254	5,782	99,260	2,563,121	964,274	140,000	820,420	—154,155
Long Island	398	324,304	508,755	965,233	107,757	106,442	11,192	444,134	11,060	66,317	705,304	259,928	65,237	194,674	117,276
Louisiana & Arkansas	279	105,379	17,900	126,834	23,860	20,447	2,817	38,582	8,623	27,156	89,647	37,187	6,250	30,937	—14,575
Louisiana Ry. & Navigation	351	133,871	19,358	163,457	30,482	19,225	5,794	70,106	.....	3,989	131,133	32,325	7,500	24,825	—24,611
Louisville & Nashville	208	120,192	53,633	186,650	18,028	37,882	7,175	58,832	.....	5,525	131,217	55,433	12,539	42,892	2,042
Louisville, Henderson & St. Louis	5,034	2,925,162	823,914	4,050,145	639,406	870,315	111,448	1,474,710	2,798	6,513	3,205,780	844,365	184,275	659,642	—560,045
Maine Central	200	68,709	30,678	106,903	23,047	15,845	5,021	38,651	13,389	105,664	2,858	21,481	3,800	17,655	—9,829
Michigan Central	1,219	627,046	243,842	934,006	136,787	155,429	10,361	349,616	3,032	25,498	680,722	253,284	49,788	203,491	8,219
Midland Valley	1,800	1,569,695	36,101	2,526,096	290,212	443,321	70,939	1,169,626	56,256	54,770	2,085,124	440,972	134,000	305,936	—35,351
Minneapolis, St. Paul & Sault Ste. Marie	380	88,219	479,333	2,441,074	22,931	17,283	2,179	40,470	.....	5,278	88,140	44,154	6,582	37,525	2,743
Missouri, Kansas & Texas System	4,102	1,793,097	634,073	32,294	443,321	232,675	333,412	42,809	787,779	13,453	47,708	1,447,073	994,001	84,208	909,794
Missouri Pacific	3,865	2,134,480	706,397	3,033,044	378,738	393,460	58,086	1,008,432	23,028	79,583	1,940,072	1,092,973	102,635	989,852	—136,627
Mobile & Ohio	334	80,825	18,400	104,049	23,545	12,430	3,470	39,914	110	4,950	84,419	19,630	6,462	13,153	—18,322
Monongahela	3,920	1,866,209	375,882	2,433,220	324,678	460,796	67,505	953,554	4,610	61,660	1,872,802	560,418	98,590	460,790	152,474
Morgan's La. & Tex. R. & S. S. Co	1,122	667,433	91,938	810,352	76,188	84,279	41,262	326,424	29,686	559,754	31,358	23,390	27,595	222,743	—10,402
Nashville, Chattanooga & St. Louis	405	71,179	1,996	74,749	15,238	7,292	585	26,251	1,914	1,993	291,576	165,700	1,140	22,250	—47,932
Nevada Northern	75	339,618	81,627	457,276	41,317	54,272	11,537	170,565	.....	11,620	751,568	17,310	17,310	148,334	—5,777
New Orleans & North Eastern	1,231	628,581	189,365	895,099	124,030	171,096	45,969	375,014	6,039	29,420	143,532	27,213	116,292	—130,851	
New Orleans, Great Northern	165	55,190	7,234	65,371	13,153	11,842	420	19,777	56	3,827	49,076	4,064	13,000	12,232	—52,811
New Orleans, Mobile & Chicago	204	199,427	38,431	263,317	32,484	61,326	9,413	93,588	6,183	12,562	215,555	47,762	34,762	—27,764	
New York, Chicago & St. Louis	283	85,349	21,426	117,660	16,109	16,881	2,617	38,017	155	6,996	80,775	13,000	35,217	—25,096	
New York, New Haven & Hartford	403	105,998	20,994	136,191	29,155	16,179	3,755	53,239	—4	6,408	108,733	36,886	21,228	56,013	
New York, Ontario & Western	286	115,780	18,889	140,469	29,502	13,973	3,003	49,547	.....	9,535	105,561	27,458	6,180	33,287	—9,884
New York, Philadelphia & Norfolk	2,003	2,390,991	99,350	932,518	102,598	135,431	37,885	418,295	.....	19,606	718,259	34,908	1,621	172,257	—42,736
Norfolk & Western	568	519,419	2,160,667	5,125,780	638,475	877,892	37,320	2,032,142	4,443	128,242	3,758,920	214,259	42,000	1,157,714	—24,049
Norfolk Southern	112	222,513	76,992	694,958	94,779	137,180	8,730	288,313	45,813	14,528	543,531	1,366,859	209,000	131,427	39,325
Northern Pacific	140	158,957	36,075	281,269	59,797	29,527	3,688	137,958	.....	4,469	9,074	151,427	20,000	34,049	—14,695
Oregon Short Line	2,044	2,575,424	41,263	226,635	27,797	2,278	109,144	.....	5,082	240,595	40,674	12,000	28,662	39,689	
Oregon-Washington R. R. & Nav. Co.	900	202,832	363,141	3,074,133	354,395	602,449	53,862	1,006,541	9,485	173,820	52,815	13,125	865,005	—19,843	
Panhandle & Santa Fe	6,458	4,190,535	75,678	300,209	38,402	51,621	6,842	116,000	72,648	2,054,128	1,020,005	155,000	172,257	—217,364	
Pennsylvania *Company*	2,162	1,272,056	1,007,040	5,648,727	522,177	523,483	84,047	1,651,259	361	19,874	233,101	9,525	57,580	—33,947	
Pere Marquette	668	837,118	345,133	1,766,777	250,901	230,422	27,514	426,662	77,127	97,591	2,848,150	1,012,346	2,800,577	404,196	2,396,357
Philadelphia, Baltimore & Washington	1,757	292,686	327,426	1,279,481	178,744	162,624	41,484	429,389	11,732	57,221	875,627	403,854	89,296	314,504	87,234
Pittsburgh & Lake Erie	4,519	2,837,069	50,059	357,173	72,068	62,875	3,946	114,359	.....	8,092	261,341	95,832	8,598	87,234	—248,359
Pittsburgh, Cincinnati, Chic. & St. Louis	2,319	10,261,335	734,029	4,057,245	757,756	839,138	86,445	1,586,886	.....	37,325	3,410,768	646,477	261,356	385,074	—164,654
Richmond, Fredericksburg & Potomac	717	1,089,460	3,107,073	14,825,283	1,947,618	3,020,514	202,398	5,796,895	217,223	108,217	11,587,763	3,237,520	731,333	2,505,042	—320,371
Rutland	224	733,055	286,269	1,484,421	128,375	300,788	30,642	594,069	3,608	35,708	1,093,116	391,306	52,891	338,414	282,049
St. Louis & San Francisco	1,472	832,767	727,129	1,641,491	246,139	303,254	26,472	703,770	10	42,534	1,322,181	811,067	193,045	57,663	261,601
St. Louis, Brownsville & Mexico	88	1,883,088	126,361	1,004,112	169,711	276,702	15,040	319,147	2,955	27,512	811,067	2,407,344	466,891	52,230	140,795
St. Louis, Iron Mountain & Southern	4,746	115,455	585,005	2,874,234	411,710	651,574	15,040	1,171,536	24,488	4,978	154,047	64,700	171,704	294,993	—353,433
St. Louis Merchants' Bridge Terminal	548	174,384	74,027	218,747	21,746	30,400	2,933	86,869	7,101	7,123	206,619	83,105	6,476	17,088	58,131
St. Louis, San Francisco & Texas	3,365	1,930,527	79,657	289,725	34,677	44,994	7,101	113,257	1,187	5,402	83,105	17,088	66,018	—16,958	
San Antonio & Aransas Pass	9	.....	432,074	2,555,914	501,151	558,471	61,975	1,163,362	.....	84,729	2,369,687	1,078,745	83,706	993,751	—28,661
San Pedro, Los Angeles & Salt Lake	235	85,011	52,620	170,211	32,988	21,433	5,199	61,361	10,521	.....	131,384	38,827	6,750	32,077	—40,527
Seaboard	724	832,767	135	146,470	373,710	428,149	56,944	834,925	7,286	59,019	1,760,033	795,881	113,032	681,519	—406,557
Southern	1,132	476,659	26,064	116,723	21,971	7,898	802	76,377	.....	4,241	114,680	82,922	33,802	8,330	23,454	—353,433
Tennessee Central	3,101	1,211,477	77,409	326,110	169,711	17,053	1,840	42,533	.....	7,632	114,680	82,922	33,802	8,330	23,454	2,944
Terminal R. R. Ass'n of St. Louis	7,036	3,371,440	327,707	1,713,798	704,706	74,100	65,912	73,376	1,840	59,019	131,384	1,078,745	83,706	993,751	—71,789	
Texas & Pacific	294	73,715	1,216,577	5,046,463	224,554	118,261	6,826	165,514	.....	7,632	1,760,033	795,881	113,032	681,519	—16,958	
Toledo & Ohio Central	35	.....	27,972	109,595	683,026	230,085	31,081	243,811	11,575	11,502	114,680	82,922	33,802	8,330	23,454	—28,661
Toledo, Peoria & Western	1,887	1,320,772	168	223,727	31,168	770,071	71,686	628,446	11,575	16,873	323,130	2,980	12,002	—9,083	—40,527	
Union Pacific	446	381,862	350,844	1,784,923	22,691	186,207	5,461	1,844,977	7,201	55,712	495,701	209,005	41,989	167,002	—406,557	
Union R. R. of Baltimore	248	48,078	454,678	165,291	12,710	5,461	1,844,977	27,231	161,799	1,237,685	476,112	91,000	384,793	—152,764	2,944	
Union R. R. of Pennsylvania	3,615	3,276,820	35,228	94,178	67,805	250,265	950	77,636	.....	6,687	3,652,946	1,393,517	218,110	1,173,164	—55,866	
Vandalia	9	103,255	788,714	4,545,925	15,472	86,584	36,997	717,829	6,224	104,984	4,610	86	—16,653	—6,285		
Vicksburg, Shreveport & Pacific	31	.....	23,580	128,767	507,982	31,607	6,912	175,084	12,271	39,335	120,211	103,516	31,517	71,998	—210,848	
Virginian	910	598,877	.....	213,054	14,822	608,712	2,367	44,775	1,719	9,843	1,220,539	564,384	68,700	495,548	—623,968	
Washington Southern	171	61,713	186,847	893,736	31,251	.....	90,375	1,149,137	.....	3,652	347,947	106,730	25,299	80,342	—16,653	
West Jersey & Seashore	503	376,477	37,300	113,086	95,969	.....	.....	4,540	74,221	121,088	2,550,386	—3,894	6,100	—9,994	—88,950	
Western Maryland	36	32,212	29,184	436,479	130,778	22,622	27,809	369,707	.....	2,697	22,059	1,995,538	185,119	1,809,955	53,077	
Wheeling & Lake Erie	356	143,635	36,156	93,682	175,375	24,053	.....	.....	.....	2,581	243,016	—29,962	6,230	100,477	—4,138	
Yazoo & Mississippi Valley	661	532,393	207,031	393,697	58,541	10,837	3,386	46,364	2,297	5,032	734,503	159,233	29,826	—30,791	—98,786	
	133	53,705	69,598	634,111	91,789	83,525	4,762	108,021	10,139	10,798	103,754	275,146	8	129,407	—21,347	
	459	318,363	33,455	96,557	99,479	14,214	1,193	40,109	10,316	216,544	2,123	2,940	161,332	9,332	6,000	—83,972
	1,382	879,032	191,838	396,317	18,947	107,992	24,252	20,954	243,793	2,450	13,290	71,418	405,285	22,264	3,236	138,609	—69,583
				1,124,273	38,784	24,252	6,097	243,793	1,378	19,113	492,548	—11,587	22,500	19,028	—33,319	
				152,310	134,339	9,251	160,511	1,597	4,154	141,563	29,543	—41,152	138,609	—128,222		
						16,350	397,322	2,050	14,252	85,669	10,888	25,500	5,816	116,063	—6,616	
									24,010	271,427	124,890	5,034	5,034	97,807	12,056	
										725,677	398,596	30,948	93,942	—29,797		
												50,000	348,485	—117,432		
														—166,647		

Traffic News

The "Far Western Travelers' Association" will have its annual banquet at the Hotel Astor, New York City, February 9.

The White Audit System of checking passenger train collections was adopted on January 1, by the Pere Marquette, the Atlanta & West Point, the Georgia, the Toledo, St. Louis & Western and the Virginian.

Representatives of the passenger departments of the principal railroads operating in Indiana have held a number of meetings with business men's organizations in the larger cities of the state, asking their support for the plan to have the legal passenger fare advanced from 2 to 2½ cents per mile.

The principal railways of Virginia have joined in an application to the State Corporation Commission for authority to make a general advance of 5 per cent in freight rates throughout that state. The commission is giving public hearings on the question this week. The application does not cover coal and coke, nor iron ore and limestone used in making pig iron.

Shipments of anthracite coal are reported for the calendar year 1914 as amounting to 68,302,961 tons, which is 766,667 tons less than in 1913. The total output, including an estimated 3 per cent sold to local trade and to employees, was over seventy millions, and in addition to this an estimated quantity of eight millions was used in operating the mines.

A meeting of the Fiber Container Conference Committee, consisting of the chairmen of the Official, Southern and Western Classification Committees and the Uniform Classification Committee, will be held in Chicago on January 14, to consider subjects relating to fiberboard containers and the rules regulating them in the various classifications which have been presented since the last meeting of the committee.

The people of Pittsburgh now receive nearly or quite all of their milk in the latest designs of refrigerator cars, and the Department of Agriculture has issued a circular telling how the agents of the department have been chiefly instrumental in bringing about this improvement; much of the milk having formerly been brought in ordinary baggage cars where its quality was much impaired by the heat. The inspectors of the government had found that some of the milk contained 22,800,000 microbes (or other animals) per cubic centimeter.

According to the Des Moines Register and Leader, the Iowa Railroad Commission has reached an understanding with the state executive council, authorizing the commission to draw on the council until the legislature meets in January for expenses to be used in opposing before the Interstate Commerce Commission the proposed advances in freight rates on the Western Trunk Line roads. It is said that no limit is placed on the amount to be thus expended, but that the agreement takes the place of an appropriation of $5,000 which the commission had asked for, and that it is understood that the expenses are to be held as close to $5,000 as possible.

On January 4, a daily through package car service was established from Chicago to Havana, Cuba, by the Illinois Central, Nashville, Chattanooga & St. Louis, Central of Georgia, Atlantic Coast Line and Florida East Coast railways, in connection with the Florida East Coast car ferry service from Key West to Havana, on the new steamer Henry M. Flagler. For the first time freight can be carried from this country to Cuba without transfer of any kind. Trains leave Chicago at 10:30 p. m. daily, except Sunday, arriving at Atlanta at 12:05 p. m. the third day, Jacksonville at 12:30 p. m. the fifth day, Key West at 6:30 p. m. the sixth day, and Havana at 6 a. m. the seventh day. The through rates from Chicago and other northern and western points are based on the combination on Key West. A new tariff covering the rates from Key West to Havana has been published by the Gulf Foreign Freight Committee, effective January 1, and the rates include marine insurance from Key West to Havana, On shipments to Cuban points other than Havana arrangements can be made for the Cuban railway representatives to handle the entry papers and trans-ship at that point to through cars for the principal destinations beyond.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Examiner Eddy held a hearing at Chicago on January 4, on the adjustment of lake-and-rail rates to Chicago, Duluth and Minneapolis and St. Paul.

The commission has suspended from January 1 to April 30 tariffs of the Alabama & Vicksburg, the Chicago & Eastern Illinois, the Louisville & Nashville and other carriers containing increased rates on coal from mines in Alabama, Illinois, Kentucky and Tennessee to Memphis, Tenn., and other points.

Transit Privileges on Grain Products at Pittsburgh

Grain & Hay Exchange of Pittsburgh v. Pennsylvania Company et al. Opinion by the commission:

The commission finds that the refusal of defendants to provide certain transit arrangements on grain and grain products at Pittsburgh is not unreasonable or discriminatory. It is also found that the proposed withdrawal of certain features of respondents' present transit arrangements on grain and grain products at Fittsburgh is justified. (32 I. C. C., 409.)

Switching Charges at Baltimore

Opinion by Commissioner McChord:

In May, 1912, the Public Service Commission of Maryland entered an order by which the switching limits of Baltimore were extended and maximum rates prescribed upon a per car basis for interchange, yard, industrial and general switching on the lines of carriers in that city, these charges being as follows: $1 per car for "yard" switching and $5 per car for "industrial" switching. The commission's order prescribed these rates as maximum rates, but did not include the proviso that existing rates should not be increased. The various carriers at Baltimore have now issued tariffs establishing these rates and the commission finds that it is reasonable that they be applied on interstate business. (32 I. C. C., 376.)

Mississippi River Case

In its original decision in this case, given in 28 I. C. C., 82, and abstracted in the *Railway Age Gazette* of August 8, 1913, page 247, the commission held that the class rates between New York and the upper Mississippi river crossings, including Keokuk, Fort Madison, Burlington, Muscatine, Davenport, Clinton and Dubuque, in Iowa, ought to be no higher than between New York and the lower Mississippi river crossings. It refrained from fixing such equality of rates, however, because of the material reductions in the carriers' revenues which would thus be caused. It now appears that the findings in Revenues of Rail carriers in Official Classification Territory, and Rate Increases in Official Classification Territory, cannot reasonably be carried out without some change in the former order, or else some serious disturbance in the relationship between commercial cities. It is therefore ordered that the carriers file on not less than 10 days' notice rates applying on traffic between New York and the upper crossings, which shall not exceed the class rates contemporaneously maintained between New York and St. Louis. In other respects the order of June 17, 1913, shall remain in full effect.

Hearings on Western Rate Advances

The Interstate Commerce Commission has announced that hearings will be held in Chicago beginning on February 15, on the proposed increases in freight rates west of Chicago that have been filed by the roads in Western Trunk Line and Southwestern Tariff Committee territories. The hearings will be conducted by Commissioner Daniels. February 15, 16, 17 and 18 are to be devoted to the presentation of evidence by the railways supporting in general their claims for increased rates, but not including evidence in support of increases of particular rates. Beginning Monday, March 15, opportunity will be given for the

presentation of evidence in rebuttal of such general testimony. In addition, dates have been set for hearings on the rates on particular commodities involved, as follows: February 19 to 24, grain and grain products; February 25 to 27, livestock, fresh meat, packing house products and fertilizer; March 1 and 2, hay, straw and broom corn; March 3 to 5, cotton piece goods; March 6 to 9, coal and coke; March 10, salt; March 11 and 12, fruit and vegetables; March 13, rice and rice products.

Shipments on Packing-House Products in Peddler Cars

In re rules governing shipments of packing-house products and other freight shipped in peddler cars. Opinion by Commissioner Clements:

The commission finds that the carriers have not justified a proposed increase from 10,000 lb. to 12,000 lb., in the minimum weight applying on packing-house products and other commodities shipped in peddler cars between western trunk line territory. The commission states in its decision: "It appears that the service rendered in connection with peddler cars is generally not greater, and in some instances less, than the service rendered in connection with less-than-carload traffic handled through the freight houses; that for the peddler-car service the user pays the regular less-than-carload rates, guarantees the carrier a minimum per car earning, saves the carrier the expense of refrigeration, reduces loss and damage claims, and gives to the carrier a volume of traffic which could not be satisfactorily transported in its own equipment." The record also does not carry out the carriers' contention that the service is conducted at a loss. (32 I. C. C., 428.)

Stoppage in Transit to Finish Loading of Livestock Shipment

Hoyt & Bergen v. Chicago & North Western. Opinion by Commissioner Meyer:

The commission having made an investigation of the practice throughout western classification territory of stopping livestock shipments in transit to finish loading finds that the Chicago & North Western and other carriers are justified in refusing to provide for such stoppage. It is found that not more than three or four per cent of all shippers of livestock over defendants' lines availed themselves of the privilege when it was in effect, and it is held that the need for expeditious service distinguished the transportation of livestock from that of other commodities for which a stoppage service is provided. It is also found that the carriers' rule which makes applicable on mixed carloads of livestock, the rate prescribed for the highest graded class of stock in the car, subject to the highest minimum weight for any class of stock in the car is reasonable. (32 I. C. C., 319.)

The Tailboard Cases

Philadelphia Team Owners' Protective Association et al. v. Philadelphia & Reading et al. Opinion by Commissioner Harlan:

These proceedings represent an effort on the part of team owners in Philadelphia, New York and Cincinnati to bring about a change in the rules governing the receipt and delivery of less-than-carload freight. It is alleged that the carriers do not perform their full duty as common carriers in that they do not make a proper and complete delivery of freight at their terminals, and that they discriminate between persons and places. The relief prayed for is an order directing defendants to establish a rule providing for a so-called tailboard delivery and a tailboard receipt. By tailboard delivery is meant that the defendants shall make the goods really accessible, either by permitting the complainants to back their trucks to the place at the station where the goods have been placed or, if the arrangement of the platform or pier renders that impracticable, that the defendants, by their own employees, shall truck the goods to the tailboards of the wagons. By tailboard receipt is meant that the defendants shall promptly receive outgoing merchandise at the tailboards of the wagons, without requiring the complainants to remove the goods previously unloaded at that point by other shippers and that the complainants shall not be required to unload their shipments at more than one location upon the station platform.

The legal duties of common carriers in connection with the delivery of package freight have been clearly stated in numerous decisions of the courts. It appears that when the goods have been so placed in the warehouse at the point of destination as to be reasonably accessible to the consignee, open to his inspection, and permitting of their safe and convenient removal by the consignee or his agent, common-carrier liability ceases and the responsibility thereafter is that of a warehouseman only. Goods are not regarded as being ready for delivery if they are so placed as not to be obtainable by the person to whom delivery is to be made or if they are so mingled with or covered by other goods that the consignee cannot inspect or remove them without himself undertaking their selection and separation from the heap.

It is by no means conclusive that the carriers have willfully refused or neglected to effect the full delivery contemplated by law. On the contrary, the evidence shows that they are ready at all times to render any assistance that may be necessary to locate, uncover, and place in an accessible position any package that is called for, and will even assist in loading it if it is too bulky or heavy to be loaded by the consignee. The law requires no more than this, and to require of the carriers an additional movement of the freight from the floor of the warehouse to the trucks of the consignee or drayman would be unwarranted and arbitrary.

It is true that at Cleveland, Buffalo and a few other places a modified system of tailboard delivery is in effect, having grown up largely through competitive influences or peculiar local conditions. But even where this system is provided the teamsters are not excluded from the platforms, nor do the majority of them take advantage of it.

The teamsters in one city are not in competition with those of another, and it does not follow that because a form of tailboard delivery is maintained at a few places under peculiar and special conditions an order would be justified imposing this duty upon the carriers at all places.

In order to expedite the handling of the freight, as well as to conserve the floor space, the carriers have adopted the practice of segregating the shipments intended for the consignees or teamsters who receive daily a considerable volume of freight and who undertake to remove it early each morning. There is no discrimination in this practice, for any consignee or teamster who is able and willing to observe the requirements as to volume of traffic and prompt removal of goods may have his freight so segregated if he desires. This is held to be a reasonable practice, resulting not only to the advantage of the defendants through efficiency of station operation, but also to the general public and the teamsters who, under the prevailing system, are obliged to go upon the station platforms to obtain their goods.

The complaints respecting the defendants' methods of receiving outbound package freight refer particularly to the so-called "peddling system," in operation at a few of the stations. It appears that outbound freight is despatched on trains operating on regular schedules and departing soon after the published closing time of the station; the plan of partial segregation complained of has been found necessary in order that such freight may be forwarded the same day that it is received. The necessity for some such arrangement is obvious, for the record indicates that during the last hour and a half of the day more than 50 per cent of the outbound freight is received at the stations, the greatest rush being from 4 to 4.30 in the afternoon. If freight for all destinations were dumped indiscriminately at every receiving doorway, it would be manifestly impossible for the carriers at some of their stations to separate and load it into the proper cars between the time it is received and the time the trains depart.

The commission, therefore, finds that the methods which have been adopted by the defendants for the receipt and delivery of package freight are reasonable and non-discriminatory, and have been formulated through the experience gained in the operation of each individual station. It would appear that the teamsters and shippers are themselves responsible for much of the delay, in that the hauling to and from the stations is not more uniformly done throughout the day. The practice of hauling inbound freight in the early morning hours and outbound freight during the late afternoon results in congestion that would be greatly relieved if the hauling were distributed more evenly.

"In view of these conclusions the jurisdiction of the com-

mission and the power of the complainants to invoke that jurisdiction need not be discussed at length. It is sufficient to call attention to the fact that the complainants, acting in the capacity of draymen, have no interest in the goods transported nor in the payment of the transportation charges."

STATE COMMISSIONS

The Ohio Public Utilities Commission has issued a decision holding that the Lorain & Southern Railroad, which is owned by the Ohio Quarries Company, is a common carrier, and is entitled to divisions of through freight rates.

Representatives of eight western state commissions, including accountants, have been holding meetings at Des Moines, Iowa, preparing statistics to be used in opposing the proposed advances in freight rates on the western roads at the hearings before the Interstate Commerce Commission to be held in February.

COURT NEWS

The Supreme Court of the United States has dismissed an appeal of the Louisville & Nashville from a decision of the United States District Court, sustaining the Kentucky Railroad Commission's order reducing rates on grain and other supplies for Kentucky distilleries.

The Supreme Court has declared void the city ordinance of Covington, Ky., providing that street cars crossing the Ohio river to Cincinnati shall carry only a certain number of passengers (above their seating capacity). The court held that the ordinance was a burden on interstate commerce.

The Supreme Court of the United States this week set aside a judgment of the Court of Appeals, which had awarded to Sarah E. Holbrook and five children $25,000 for the alleged negligent killing of their husband and father, a bridge carpenter on the Norfolk & Western. The trial court had instructed the jury that little children were entitled to greater damages than adult dependents.

The question of the employment of alien labor in the construction of subways in New York City was the subject of a recent decision by the Appellate Division of the New York Supreme Court, in which it reversed the decision of the lower court and declared the right of contractors to employ laborers whether citizens or not. The court held without a dissenting vote that the State had no more right to impose the test of citizenship on the men employed in such operations than it would have if the entire enterprise was that of private citizens or corporations. In a long decision by Justice Scott and concurred in by all the members, the court says: "The subway is a business enterprise of the city through which money may be made or lost, the same as if it were owned by an ordinary railroad corporation. It is built and belongs to the city as a proprietor and not as a sovereign."

Immunity Only for Unwilling Witnesses

Judge William I. Grubb, in the United States court at New York, January 4, overruled the immunity pleas of John L. Billard, James S. Elton and William Skinner, directors of the New York, New Haven & Hartford, who are under indictment, accused of having conspired to control the transportation facilities of New England. They contended they were immune to indictment and prosecution because they had testified before the Interstate Commerce Commission concerning the matter in which the indictments were found. Judge Grubb says:

"My conclusion is that the immunity act was intended only to make available testimony compulsorily given and only to reward the unwilling giver of such evidence; that testimony given without the assertion of the constitutional privilege, or declined to be given upon any other ground than that of its incriminating tendency, is not compulsory testimony under the fifth amendment, and has always been available without new remedial legislation; and so, there being no necessity for conferring immunity on the giver of it, Congress will not be construed to have done so, where its language may be reasonably otherwise construed. . . ."

Railway Officers

Executive, Financial, Legal and Accounting

A. P. Cassile has been appointed auditor of the Pascagoula-Moss Point Northern with office at Moss Point, Miss.

A. W. Newton, chairman of the Valuation Committee of the Chicago, Burlington & Quincy at Chicago, has been appointed assistant to president with headquarters at Chicago.

Abraham Tracy Hardin, who has been appointed vice-president of the New York Central Railroad in charge of the operating department, embracing transportation, construction, roadway and equipment, with headquarters at New York, as has already been announced in these columns, was born in 1868, in South Carolina, and graduated from the University of South Carolina with the degree of civil engineer in 1894. Previous to graduation, he had been a telegraph operator in 1882, on the Richmond & Danville, and from 1882 to 1890 he was agent and stenographer on the same road. He attended college from 1890 to 1894, and then for four years was in the maintenance of way department of the Southern Railway. From 1898 to September, 1899, he was supervisor and division engineer of the Eastern division of the New York Central & Hudson River. He was then promoted to engineer of track, and from February, 1903, to July, 1905, he was engineer of maintenance of way, and then for about one year was assistant to the general manager of the same road. From June, 1906, to April, 1912, he was assistant general manager; he was then apponted assistant vice-president, and in April, 1913, became vice-president of the same road, which position he held until his appointment on January 1 as vice-president of the New York Central Railroad, which is the name of the new company which has taken over the New York Central & Hudson River and the Lake Shore & Michigan Southern.

P. E. Crowley, general manager of the New York Central & Hudson River, at New York, has been appointed assistant vice-president of the operating department in charge of transportation and equipment maintenance, of the New York Central Railroad, with headquarters at New York. He was born in August, 1864, at Cattaraugus, N. Y., and began railway work with the Erie as messenger boy in 1878. The following year he was promoted to telegraph operator, and was later station agent and then train despatcher on the same road. In 1890 he entered the service of the New York Central & Hudson River as train despatcher on the Rome, Watertown & Ogdensburg division, and was promoted to chief train despatcher in 1891. The same year he was made trainmaster, and in September, 1900, was appointed chief trainmaster of the Pennsylvania division. He was promoted to superintendent of the Pennsylvania division in August, 1901, and was made assistant general superintendent in December, 1904. Mr. Crowley was appointed general superintendent of the same company in June, 1905, and was promoted to assistant general manager in March, 1907, remaining in that position until April, 1912. He was then general manager of the same road until January 1, when he was appointed assistant vice-president of the New York Central Railroad which has taken over the New York Central & Hudson River and the Lake Shore & Michigan Southern.

P. E. Crowley

Grant Hall, general manager of the western lines of the Canadian Pacific at Winnipeg, Man., has been appointed vice-president and general manager, with headquarters at Winnipeg, of lines west of Port Arthur, and C. E. Stockdill has been appointed assistant to the vice-president and general manager with office at Winnipeg, in place of J. Manson, who has been appointed assistant to vice-president, with office at Montreal, Que.

It has now been announced that on October 23, 1914, Luis Cabrera was elected president of the National Railways of Mexico, succeeding E. N. Brown. Alberto J. Pani was elected vice-president and Charles R. Hudson was elected vice-president in charge of operation, all with headquarters at Mexico City, Mex. D. P. Bennett, vice-president, with office at New York, resigned on December 31.

Troy Pace, assistant attorney of the Missouri Pacific system, has been appointed general attorney for the Northern district of Arkansas, with headquarters at Little Rock, his territory consisting of all counties north of the Arkansas river, except the territory in the jurisdiction of General Attorney Thomas B. Pryor. E. B. Kinsworthy, with headquarters at Little Rock, remains general attorney for Pulaski county and all counties of the Arkansas river, and has jurisdiction over all matters in the state before the Arkansas Railroad Commission. Effective January 1.

As announced in our issue of December 25, Francis T. A. Junkin, general attorney of the Atchison, Topeka & Santa Fe system, has resigned, effective December 31, in order to be able to devote more time to his personal affairs and to study and travel. He will engage in private practice in Chicago and New York, giving special attention to matters involving the united corporate action of railroads where the interests of all are identical. His close personal relationship with the management of the Santa Fe system will continue and he will remain a director of Santa Fe subsidiary corporations. Mr. Junkin was born in Virginia on February 3, 1864. He was graduated from Kenyon College in 1884, from the Law School of Columbia University, New York, in 1887, and had conferred upon him the degree of LL.D. in 1913 by Kenyon College and also by Washington and Lee University. He was admitted to the New York bar in 1887, practiced law in Wall street from 1887 to 1898, and since that time has been with the Santa Fe as general attorney of the entire system. Mr. Junkin, during his whole professional life, has made a specialty of railroad and general corporation law. He is the author of many pamphlets on political subjects and the author of many addresses which he has given on various occasions.

F. T. A. Junkin

Operating

W. J. Warnick is appointed trainmaster of the Toronto, Hamilton & Buffalo with office at Hamilton, Ont.

J. F. Withrow, trainmaster of the Toledo Terminal Railroad, of Toledo, Ohio, has been appointed superintendent, and the former position is abolished.

A. M. Whiteford has been appointed trainmaster of the Lehigh and Susquehanna division of the Central of New Jersey with office at Mauch Chunk, Pa.

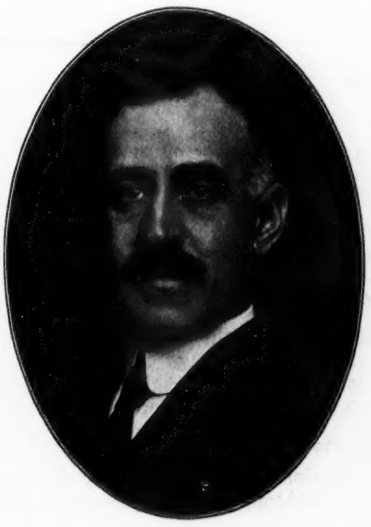
J. H. Patterson, acting assistant trainmaster, has been appointed assistant trainmaster of the Toledo division of the Pennsylvania lines west of Pittsburgh, with office at Toledo, Ohio.

B. B. Greer, assistant to general manager of the Chicago, Burlington & Quincy for the lines east of the Missouri river, at Chicago, has been appointed assistant general manager of the same lines with headquarters at Chicago.

W. H. Fogg, superintendent of the Northern division of the Chicago, Indianapolis & Louisville, with headquarters at La-Fayette, Ind., has had his jurisdiction extended over the Southern division, succeeding J. M. Baths, resigned.

W. J. Fripp, assistant general manager of the New York Central & Hudson River at Albany, N. Y., has been appointed general manager (east of Buffalo) of the New York Central Railroad, which is the name of the new company which has taken over the New York Central & Hudson River, the Lake Shore & Michigan Southern, and the Chicago, Indiana & Southern. Mr. Fripp will have his quarters at Albany; D. C. Moon, general manager of the Lake Shore & Michigan Southern at Cleveland, Ohio, has been appointed general manager of the new company in charge of the lines from Buffalo to Chicago, with headquarters at Cleveland; and the following general superintendents have been appointed: T. W. Evans, in charge of the lines between Buffalo and Syracuse, and from Montreal, Que., to Clearfield, Pa., with office at Syracuse, N. Y.; E. J. Wright, in charge of the lines between Syracuse and the electric zone in New York, including the line into the Adirondacks and the Harlem division, with office at Albany, N. Y.; Miles Bronson, in charge of the electrical division, with headquarters at New York; Albert S. Ingalls, in charge of the lines between Buffalo and Toledo, Ohio, with headquarters at Cleveland, and Frank H. Wilson, in charge of the lines between Toledo and Chicago, with headquarters at Chicago. (See an item in General News.)

W. J. Fripp, assistant general manager of the New York Central & Hudson River, at Albany, N. Y., has been appointed general manager of the lines from New York to Buffalo, inclusive, of the New York Central Railroad, with headquarters at Albany, and the position of assistant general manager has been abolished. He was born on August 25, 1863, at Albany, N. Y., and graduated from the high school of his native town in 1880. In July of the same year he entered the service of the New York Central & Hudson River at West Albany as a yard clerk, and eight years later was transferred as clerk to the office of C. M. Bassett, superintendent of the Mohawk division. In 1892 he was promoted to general despatcher in the freight yard at West Albany, and the following year was made freight trainmaster, becoming passenger trainmaster in 1898 on the Mohawk division, and in 1902 he was made assistant division superintendent. In 1906 he was division superintendent of the West Shore Railroad at Weehawken, N. J., and was subsequently assistant general superintendent and then general superintendent of the Boston & Albany at Boston, Mass. He returned to Albany in 1910 as general superintendent of the Eastern district of the New York Central & Hudson River, and in April, 1912, he was appointed assistant general manager at Albany of the same road, which position he held at the time of his recent appointment as general manager of lines from New York to Buffalo of the New York Central Railroad which has taken over the New York Central & Hudson River and the Lake Shore & Michigan Southern.



W. J. Fripp

J. E. Maun has been appointed acting assistant superintendent of the Montpelier, Barre and Williamstown lines, including Montpelier Junction, of the Central Vermont, in charge of passenger transportation, with headquarters at Montpelier, Vt.

J. M. Baths, division superintendent of the Chicago, Indianapolis & Louisville at LaFayette, Ind., has been appointed assistant division superintendent of the Chicago Great Western, with headquarters at Red Wing, Minn., in place of W. B. Harrison, resigned.

B. C. Cooper, trainmaster of the Vandalia at Logansport, Ind., has been appointed acting superintendent of the Michigan division, with headquarters at Logansport, in place of F. L. Campbell, superintendent, who has been granted a leave of absence on account of ill health.

D. C. Coleman, general superintendent of the Alberta division of the Canadian Pacific at Calgary, Alta., has been appointed assistant general manager of the western lines in charge of maintenance and operation, with headquarters at Winnipeg, Man. (See Executive, Financial, Legal and Accounting.)

Receiver E. B. Pryor of the Wabash announces that the resignation of Henry Miller as general manager for the receiver has been tendered and accepted. All business heretofore handled by the general manager will until further notice be handled by S. E. Cotter, general superintendent, St. Louis, Mo.

J. McCraw, superintendent of the Southern division of the Central Vermont at New London, Conn., having been assigned to other duties, E. J. Guthrie has been appointed superintendent of the Southern division, succeeding Mr. McCraw. Mr. Guthrie has been appointed also superintendent of the Central Vermont Transportation Company in charge of steamers operating between New London and New York, with office at New London.

Traffic

D. M. Rea has been appointed commercial agent of the Louisiana & Arkansas at New Orleans, La.

Peter Birrel, commercial agent of the Pere Marquette at Pittsburgh, Pa., has been transferred to Detroit, Mich., in a similar capacity.

M. J. Powers has been appointed general passenger agent of the Delaware & Hudson, with office at Albany, N. Y., vice A. A. Heard, resigned.

R. P. Buckingham, Jr., traveling passenger agent of the Missouri, Kansas & Texas, with headquarters at Houston, Tex., has been appointed commercial agent at Waco, Tex.

C. L. Thomas, freight traffic manager of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton, with office at Cincinnati, Ohio, has been appointed also general traffic assistant of the Baltimore & Ohio.

F. A. Bell, general agent of the freight department of the Atchison, Topeka & Santa Fe Coast Lines at San Francisco, Cal., has been appointed assistant general freight agent, with headquarters at San Francisco, and the former office is abolished.

Engineering and Rolling Stock

N. M. Barker has been appointed master mechanic of the Copper Range, with office at Houghton, Mich., in place of J. A. Berg, assigned to other duties.

Norman Bell has been appointed master mechanic of the Minnesota and Iowa divisions of the Illinois Central, with headquarters at Waterloo, Iowa, succeeding Frank W. Taylor, resigned to go to another company.

E. E. Griest, assistant master mechanic of the Pennsylvania Lines at Fort Wayne, Ind., has been appointed master mechanic at that place, succeeding B. Fitzpatrick, deceased. F. T. Huston, assistant master mechanic at Pittsburgh, Pa., succeeds Mr. Griest.

OBITUARY

Thomas L. Chapman, formerly superintendent of motive power of the Chesapeake & Ohio, died on December 30, at the home of his son in Caldwell, N. J., at the age of 71.

Charles A. Thompson, formerly superintendent of motive power and equipment of the Central of New Jersey, died on January 4 at Jamaica, N. Y., at the age of 81.

William S. Napier, Sr., general baggage agent of the Sunset-Central Lines, died at his home in Houston, Tex., on December 24, aged 65 years. Mr. Napier had been connected with the Houston & Texas Central, one of the roads comprising the Sunset-Central Lines, since 1880, and had been general baggage agent of those lines for 24 years.

N. Parker Shortridge, who had been a director of the Pennsylvania Railroad since March, 1874, and a director of other Pennsylvania lines, died on January 3, at his home in Wynnewood, Pa., at the age of 85. Mr. Shortridge was born in Portsmouth, N. H., and was educated at Dover Academy. He was for many years in the wholesale drygoods trade in Philadelphia, but retired from active participation in the business of his firm in 1877. He was an important figure in other business and financial enterprises in Philadelphia; but during the whole of his term as a director of the railroad he had given to the road the greater portion of his time. He was active in the organization and promotion of the United States Centennial Exposition of 1876.

Lucian J. Irwin, president and general manager of the Louisville, Henderson & St. Louis, died at Louisville, Ky., on December 31, as a result of an operation for appendicitis. Mr. Irwin was born at Abbeville, Miss., on May 5, 1867, and had been in railway service since 1883. He held various clerical positions with the St. Louis, Arkansas & Texas, the Illinois Central and the Louisville & Nashville, until May, 1891, when he became agent for the Cumberland Gap Despatch at Louisville, Ky. He remained with that line until December, 1889, successively as traveling freight agent, western agent at Kansas City, Mo., and agent at Chicago. On the latter date he was appointed general freight and passenger agent of the Louisville, Henderson & St. Louis; in April, 1908, he was promoted to general superintendent, and the following September he was elected president and general manager.

A SWISS SOLUTION OF THE GRADE CROSSING PROBLEM.—The Zurich Sea Left Bank Railway, the grade crossings of which are soon to be eliminated, is crossed by the surface or grade crossings of 14 streets and 3 tram lines. Since surface crossings by tram lines are forbidden, the passengers are now compelled to step out of the tram cars at the railway crossings, walk across the tracks, and board tram cars waiting on the opposite side.

ENGLISH RAILWAYMEN KILLED IN THE WAR.—Replying to applicants for accidental death benefit from branches, on behalf of members killed in the war, the executive of the National Union of Railwaymen announced, on December 17, that they had decided the union funds could not be charged with liability. Their reasons were: (1) The scale of contributions and benefits was not arranged to meet the liability of soldiers and sailors in war; (2) as war was an act of the nation for the nation's benefit, the consequence of war should be met by the government from state funds. The executive also assured members that they would press the government to make adequate provision to meet these cases.

NEW RAILWAY IN BRAZIL.—A railway has recently been opened between Itapuru, on the Rio Parana, and Porta Esperanza, near Corumba, which is the most important city of the state of Matto Grosso. Communication between Porto Esperanza and Corumba, both of which towns are on the Rio Paraguay, is effected by means of ferryboats. The new line is of considerable importance, since it puts the southern part of the state of Matto Grosso in direct railway communication with the state of Sao Paulo. The journey between Rio de Janeiro and Corumba by rail will occupy some six days, whereas previously the only means of communication between the two cities was by water, a voyage of from six to eight weeks.

ARMORED TRAINS IN WARFARE.—Something was said in a recent issue concerning the use of armored trains in the present European campaigns. One of the first and possibly the first armored train was that used during the Egyptian campaign of 1882. The train was put in service during the reconnaissance in force against Arabi Pasha's troops on August 5 of that year, and was employed on the Aboukir-Lake line. The train was in charge of Lord Charles Beresford, then commander, R. N., who shared in the conception of the idea if he did not originate it. The car employed was a truck protected by boiler plates, and armed with a 6-in. Armstrong rifled gun and a couple of Gatlings. This armored vehicle preceded the locomotive, the reverse of present practice, but it is not stated whether the locomotive was protected as well.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE ILLINOIS CENTRAL has ordered 25 Mikado type locomotives from the Lima Locomotive Corporation.

THE DETROIT UNITED RAILWAYS have ordered 1 50-ton electric locomotive from the Westinghouse Electric & Manufacturing Company.

CAR BUILDING

SWIFT & Co. will build 300 beef cars in its own shops.

THE CHICAGO & MILWAUKEE ELECTRIC is in the market for 300 40-ton all-steel passenger cars.

MORRIS & Co. have ordered 250 34-ft. refrigerator cars from the Haskell & Barker Car Company.

THE PRUDENTIAL OIL COMPANY, New York, is in the market for 200 tank cars.

THE PENNSYLVANIA RAILROAD is said to be contemplating the purchase of a large number of freight cars.

THE BALTIMORE & OHIO has ordered 1,000 hopper cars from the Cambria Steel Company, and 1,000 box cars from the Mount Vernon Car Manufacturing Company.

IRON AND STEEL

THE LOUISVILLE & NASHVILLE has ordered 38,000 tons of steel rails from the Tennessee Coal & Iron Company.

THE ATCHISON, TOPEKA & SANTA FE ordered 500 tons of steel for its freight house at Los Angeles, Cal., from the McClintic-Marshall Company.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 20,000 tons of steel rails, the order being divided among the Pennsylvania Steel Company, the Lackawanna Steel Company and the Bethlehem Steel Company.

PENNSYLVANIA RAILROAD.—Official announcement was made on January 5 by the Pennsylvania Railroad that the steel rail requirements for the Lines East and West of Pittsburgh for the current year will amount to 170,000 tons, and that bids are now being requested and orders placed for early delivery for 150,000 tons of 100-pound section, in accordance with revised specifications of 1915, the balance of 20,000 tons to be ordered later. The total quantity of steel rails ordered by the company last year was 132,432 tons.

RAILWAY CONSTRUCTION IN NORWAY.—The Norwegian Storthing passed in the year 1908 a complete plan for railway construction for the ensuing 12 years, till 1920. It was intended that a new plan for continuing the development should be ready in good time. As the original plan has been abandoned in some respects, as for instance, in the building of the Rauma Railway and the Thelemark Railway, the drawing up of a new plan has now become a necessity. The preparatory work in this connection is progressing, and the railway authorities expect that they can get the new program ready to be laid before the legislature in the year 1918.

BRITISH RAILWAYS AND WAR RISKS.—Arrangements have been completed for insuring in the London market the railway property of Great Britain against all risks of war, including bombardment and damage by aircraft, but it is understood that these have now been cancelled and that other plans have been made for meeting the contingencies. The London Times reports that the insurance, which had been placed subject to confirmation, provided that the insurance companies should pay the cost of any damage in excess of $2,500,000 up to $5,000,000. Should, therefore, damage have been done to the extent of $7,500,000 the railways would have borne $2,500,000 and the insurance companies $5,000,000. The premium agreed upon was $62,500.

Supply Trade News

Harry C. Quest, for a number of years in the railway supply business, has been made general manager of the railway department of the Nubian Paint & Varnish Company, Chicago.

The Henry Giessel Company, Chicago, has appointed Frank N. Grigg, 1201 Virginia Railway & Power Building, Richmond, Va., as its southeastern sales agent. Mr. Grigg will represent the company in all territory south of the Ohio river and east of the Mississippi river.

J. B. Berry and S. S. Roberts announce the dissolution of the firm of Berry, Howard & Roberts and the continuance of business, in the general practice of civil engineering, under the firm name of Berry & Roberts, with offices in the Transportation building, Chicago.

C. B. Yardley, Jr., has been appointed representative of the Wm. C. Robinson & Son Company, Baltimore, Md., manufacturers of high grade lubricating oils and greases. Mr. Yardley will make his headquarters at the New York office, 12 Coenties Slip, and his territory will include the eastern railroads.

Arthur G. McKee, conducting an engineering and contracting business at Cleveland, Ohio, has formed an incorporation with Robert E. Baker and Donald D. Herr, his business associates for a number of years past, under the name of Arthur G. McKee & Company. The firm will have offices in the Rockefeller Building at Cleveland, Ohio.

The incorporation is announced of the National Brass Company, Houston, Tex., with the following officers: G. F. Cotter, president; J. W. Cain, vice-president and treasurer, and F. H. Littrell, secretary. The company will specialize in the manufacture of car and locomotive bearings, as well as general railway castings. It has been appointed, also, general sales agents for the National Brass Company.

E. H. Hinkens, superintendent of the Baltimore & Ohio reclamation plant at Zanesville, Ohio, has left the service of that road to enter the sales department of the Ingersoll-Rand Company and will be connected with the latter's Philadelphia office. Mr. Hinkens served his apprenticeship with the Westinghouse company and later entered Purdue University. He afterwards became a machinist on the Baltimore & Ohio and held various positions, including that of general foreman, assistant master mechanic and superintendent of the reclamation plant, as noted above.

Of the recent order for rails placed with the Lackawanna Steel Company by the New York Central Lines 2,000 tons of open hearth rails are to be treated with .10 titanium. Although the New York Central Lines have had several small tonnages of titanium treated open hearth rails for which the Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has furnished the Ferro Carbon-Titanium free of charge for experimental purposes, this is the first bona fide order for titanium treated open hearth rails placed by the New York Central Lines and is the result of a long series of experiments which have been carried on under the general supervision of Dr. Dudley. The New York Central formerly used considerable titanium in the treatment of its Bessemer steel rails, the use of which has been practically abandoned during the last two or three years, and it has now gone over to open hearth rails almost entirely.

TRADE PUBLICATIONS

RAIL LOADER.—An 8-page pamphlet recently issued by James C. Barr, 30 Church street, New York, illustrates and briefly describes the Brown rail loader, and also gives a list of railroads using it.

VENTILATION APPARATUS.—The American Blower Company, Detroit, Mich., has recently issued a booklet describing an installation of the "Sirocco" heating, ventilating and cooling system in the plant of the Ford Motor Company at Detroit.

Railway Construction

ATLANTIC HARBOR.—This company plans to build a railroad from Ft. George Island, Fla., and St. John river, in a northerly direction to a crossing of Sisters creek, thence westerly to a point located at or near Plummer, Duval county, with a branch from the main line to the northerly limits of the city of Jacksonville, in all about 30 miles. Application has been made to the War Department for permission to build a bridge over Sisters creek. The incorporators include A. H. Broderick and G. Washburn, Boston, Mass.; E. G. Phinney; R. G. Ross; P. D. Cassidey and F. B. McGarry, Jacksonville, Fla.; W. M. Wright, St. Augustine, and G. J. Percival, Atlantic City, N. J.

CANADIAN NORTHERN.—The Canadian Northern and the Canadian Northern Ontario have applied to the Canadian parliament for an extension of time in which to build proposed branch lines as follows: From Strathcona, Alta., to Calgary, from near Swan river to the Saskatchewan river, from Regina, Sask., to Red Deer river, from Regina to Elbow, from Winnipeg, Man., to the eastern and southern boundaries of Manitoba; in Ontario, from Washago to Kincardine, Arnprior to Gananoque, Pembroke to Cobourg, Frenchman's bay to Owen sound, Niagara river to Goderich, Hawkesbury to Leeds or Lanary county, Parry sound to North bay, Berlin to Toronto, Berlin to Woodstock, Sarnia to Chatham and Orillia to Goderich.

CANADIAN NORTHERN ONTARIO.—See Canadian Northern.

ERIE & ONTARIO.—See Toronto, Hamilton & Buffalo.

KANSAS CITY, KAW VALLEY & WESTERN.—Plans have been prepared for the extension of this line from Bonner Springs, Kan., to Linwood, 10 miles, and from Linwood, Kan., to Lawrence, 10 miles. This work will require excavation amounting to about 10,000 cu. yd. a mile. The maximum grade will be 1.5 per cent and the maximum curvature 4 deg. Three bridges of 100 ft., 120 ft. and 130 ft. lengths will also be required. Contracts will be let about March 1, 1915.

NORTHERN PACIFIC.—An officer writes that the North Yakima & Valley, building from Spitzenburg, Wash., to the mouth of Cowiche canyon, 2.8 miles, with a branch to Tieton City 6.6 miles, during 1914 completed track laying on 2.93 miles between Spitzenburg and Weikel.

NORTH YAKIMA & VALLEY.—See Northern Pacific.

OREGON-WASHINGTON RAILROAD & NAVIGATION COMPANY.—Announcement has been made by this company that on December 15, 1914, the new Point Defiance line, which is a portion of its Puget Sound route between Portland, Tacoma and Seattle, was opened for service. This line completes the double track between Portland, Ore., and Tacoma, Wash.

TORONTO, HAMILTON & BUFFALO.—The Erie & Ontario, building from Smithville, Ont., via Dunnville to Port Maitland, has track laying finished to Dunnville on 14.9 miles, and is now making surveys on a section of 3.12 between Dunnville and Port Maitland.

RAILWAY STRUCTURES

SILOAM SPRINGS, ARK.—The Kansas City Southern will build a new passenger station at Siloam Springs in the near future. The building will be 24 ft. by 148 ft. in area and one story high, and will be of brick construction with a tile roof. The estimated cost is $10,000. C. E. Johnston, Kansas City, Mo., is chief engineer.

THE DALLES, ORE.—The proposed freight terminal of the Oregon-Washington Railroad & Navigation Company at The Dalles will include six switching yard tracks, each 4,000 ft. long, a 12-stall roundhouse, a machine shop 40 by 40 ft., a power house 40 by 60 ft., a storehouse 40 by 80 ft., a water tank, coaling plant, cinder conveyor, turntable, etc. There will also be approximately two miles of new track. The excavation will amount to about 109,400 cu. yd., and 236 tons of steel will be needed. The estimated cost is $200,000. Work has not yet begun.

Railway Financial News

CHICAGO, MILWAUKEE & ST. PAUL.—The directors have authorized an issue of $29,141,300 5 per cent convertible debenture bonds, to be offered to the stockholders at par to the extent of 12½ per cent of their holdings. The bonds are secured by the new general and refunding mortgage of 1913, under which the present issues of 4 per cent debentures and 4½ per cent convertible debentures, are secured. The bonds will be underwritten by Kuhn, Loeb & Co. and the National City Bank.

CHICAGO, ROCK ISLAND & PACIFIC.—On Wednesday, January 6, the court confirmed the sale of the Railway company stock which is deposited under the Railroad 4 per cent collateral bonds, which now permits the distribution of the Railway stock to bondholders under the plan of the Wallace committee, which bought in the stock.

DELAWARE & HUDSON.—This company has declared the regular 9 per cent dividends, to be paid at the regular quarterly periods in 1915.

DELAWARE, LACKAWANNA & WESTERN.—Henry R. Taylor, who recently resigned as a director of the Delaware, Lackawanna & Western Coal Company, has been elected a director of the Delaware, Lackawanna & Western Railroad Company, succeeding H. C. Fahnestock, deceased. There is now one vacancy on the board of the railroad company caused by the death recently of Henry Marcellus.

ST. LOUIS & SAN FRANCISCO.—The 4 per cent refunding mortgage bondholders' committee, of which Frederick Strauss is chairman, announces that 87½ per cent of the outstanding bonds under this mortgage have been deposited with the committee and that the committee is advised that default will again be made by the receivers in the payment of interest. The last interest payment was due on January 1, 1915. The committee has arranged, in accordance with the agreement under which it asked deposits of bonds, to buy the coupons and claims for registered bond interest of January 1 and also those due July 1, 1914, some of which have not already been bought by the committee.

TOLEDO, ST. LOUIS & WESTERN.—The federal district court has ordered the receivers to pay the interest due January 1 on $9,500,000 prior lien gold 3½ per cent bonds.

THE CAPE TO CAIRO RAILWAY.—The Cape to Cairo Railway project, naturally, is at rest at the present time. There was a piece of German territory through which the line would have to pass, or rather which blocked the line, but the English are hoping that this will be wiped out after the war. The railway has reached the heart of the Belgian Congo, a district which some of the railway officers believe will prove to be one of the greatest copper yielding countries in the world.

RUSSIAN RAILWAY BATH TRAIN.—Something was said in a recent issue about the bath train which the Russian government has equipped for the use of its troops at the front. It is stated that this bath train has met with the hearty approval of the men. This is to some extent surprising, because the Russian peasant has not always enjoyed the highest reputation for personal cleanliness. He is, however, greatly in favor of the steam vapor bath, which is said to be as much a feature of Russian village life as the public bathing establishments are characteristic of Japan. The train itself is a veritable Turkish bath on wheels. It is composed of 20 cars, and its accommodation comprises two steam bath-houses, each of which can accommodate 50 men at a time, shower baths, drying rooms for uniforms and underwear, a barber shop and even a tea car, where the men can refresh themselves after they have bathed and get into dry clothing. It has, of course, been proposed already that the idea be adopted for the men in Belgium and northern France, it being particularly true that the hot bath is one of the comforts of life most missed in the trenches.